QK1
.J5964

JOURNAL OF ETHNOBIOLOGY

Is the *Frailejón* a Life Form or an Unaffiliated Generic?: Examining the Rank of an Endemic Paramo Plant — Zent and Zent

Gitksan Plant Classification and Nomenclature — Johnson

Ethnobotanical Overview of *GOGD (Allium ramosum L.)*: A Traditional Edible Wild Plant Used by Inner Mongolians — Khasbagan *et al.*

Plant Species (Poaceae, Asteraceae, Fabaceae and Solanaceae) at an Archaeological Site in the Southern Argentine Puna — Rodriguez

Recent Doctoral Dissertations of Interest to Ethnobiologists XVII — Hays

The Process and Sociocultural Significance of Gopher Trapping in a Modern Yucatec Maya Community — Hovey and Rissolo

Volume 19, Number 2 Winter 1999

JOURNAL STAFF

EDITOR: William Balée, Department of Anthropology, Tulane University, New Orleans, LA 70118 (wbalee@mailhost.tcs.tulane.edu)

ASSOCIATE EDITOR (Spanish): Alejandro de Avila B., A. P. 533, Oaxaca, Oaxaca C.P. 68000, MEXICO (serbo@antequera.com)

EDITORIAL ASSISTANT: Meredith Dudley, Department of Anthropology, Tulane University, New Orleans, LA 70118 (mdudley@mailhost.tcs.tulane.edu)

BOOK REVIEW EDITOR: Michael K. Steinberg, Department of Geography-Anthropology, University of Southern Maine, Gorham, ME 04038 (mstein@usm.maine.edu)

SOCIETY OFFICERS

PRESIDENT: Deborah M. Pearsall, American Archaeology Division, University of Missouri, Columbia, MO 65211

PRESIDENT-ELECT: Karen R. Adams, Crow Canyon Archaeological Center, Cortez, CO

SECRETARY/TREASURER: Virginia Popper, UCLA Institute of Archaeology, Box 951519 Fowler A-210, Los Angeles, CA 90095-1510

CONFERENCE COORDINATOR: Mollie S. Toll, Museum of New Mexico, Office of Archaeological Studies, Box 2087, Santa Fe, NM 87504

BOARD OF TRUSTEES

Eugene N. Anderson, University of California, Riverside, CA

Enrique Salmón, Fort Lewis College, Durango, CO

Gail Wagner, University of South Carolina, Columbia, SC

Ex officio

Past presidents: **Steven A. Weber, Amadeo M. Rea, Elizabeth S. Wing, Paul Minnis, Cecil Brown, Catherine S. Fowler,** and **Nancy J. Turner.** Permanent board member **Steven D. Emslie**. The editor, president, president-elect, secretary/treasurer, and conference coordinator.

EDITORIAL BOARD

Eugene N. Anderson, University of California, Riverside, CA: *ethnobotany, China, Maya.*

Scott Atran, CNRS, Paris, FRANCE: *ethnobiological classification, cognition, history of science, Maya.*

Brent Berlin, University of Georgia, Athens, GA: *ethnobiological classification, medical ethnobotany, Maya.*

Robert A. Bye, Jr., Jardín Botánico, Universidad Nacional Autónoma de México, México, D.F., MÉXICO: *ethnobotany, Mexico.*

H. Sorayya Carr, El Cerrito, California: *zooarchaeology.*

Nina Etkin, University of Hawaii, Honolulu, HI: *medical ethnobotany, the Pacific.*

Gayle J. Fritz, Washington University, St. Louis, MO: *paleoethnobotany.*

Terence E. Hays, Rhode Island College, Providence, RI: *ethnobiology, Papua New Guinea.*

Chris Healey, Northern Territory University, Darwin, AUSTRALIA: *ethnozoology, Australia and New Guinea.*

Timothy Johns, Macdonald College of McGill University, Quebec, CANADA: *chemical ecology, ethnobotany, East Africa.*

Harriet V. Kuhnlein, McGill University, Quebec, CANADA: *ethno/human nutrition, First Nations of Canada.*

Brien A. Meilleur, Center for Plant Conservation, Missouri Botanical Garden, St. Louis, MO: *ethnoecology, plant conservation, ethnobotanical gardens.*

Naomi Miller, University of Pennsylvania, Philadelphia, PA: *paleobotany, ethnobotany, Near Eastern Archaeology.*

Gary Nabhan, Arizona Sonora Desert Museum, Tucson, AZ: *ethnobiology, Sonoran desert cultures.*

Darrell A. Posey, Oxford Centre for the Environment, Ethics, and Society, Oxford University, Oxford, ENGLAND: *natural resource management, ethnoecology, tropical cultural ecology.*

Amadeo M. Rea, San Diego, CA: *cultural ecology, zooarchaeology, ethnotaxonomics.*

Elizabeth J. Reitz, University of Georgia, Athens, GA: *zooarchaeology.*

Mollie S. Toll, Museum of New Mexico, Santa Fe, NM: *prehistoric and historic ethnobiology.*

The *Journal of Ethnobiology* is published semi-annually. Manuscripts for publication and book review sections should be sent to the appropriate editors as listed on the inside back cover of this issue.

© Society of Ethnobiology

ISSN 0278-0771

COVER ILLUSTRATION: Illustration of Maya gopher trap (courtesy Charles Bonscaren).

Journal of Ethnobiology

MISSOURI BOTANICAL

AUG 0 7 2000

GARDEN LIBRARY

VOLUME 19, NUMBER 2 WINTER 1999

CONTENTS

ETHNOBIOTICA v

IS THE *FRAILEJÓN* A LIFE FORM OR AN UNAFFILIATED GENERIC?: EXAMINING THE RANK OF AN ENDEMIC PARAMO PLANT
Egleé L. Zent and Stanford R. Zent 143

GITKSAN PLANT CLASSIFICATION AND NOMENCLATURE
Leslie Main Johnson 179

ETHNOBOTANICAL OVERVIEW OF *GOGD (Allium ramosum L.)*: A TRADITIONAL EDIBLE WILD PLANT USED BY INNER MONGOLIANS
Khasbagan, Narisu, and Kevin Stuart 221

PLANT SPECIES (POACEAE, ASTERACEAE, FABACEAE AND SOLANACEAE) AT AN ARCHEOLOGICAL SITE IN THE SOUTHERN ARGENTINE PUNA
Maria Fernanda Rodriguez 229

RECENT DOCTORAL DISSERTATIONS OF INTEREST TO ETHNOBIOLOGISTS XVII
Terence E. Hays 251

THE PROCESS AND SOCIOCULTURAL SIGNIFICANCE OF GOPHER TRAPPING IN A MODERN YUCATEC MAYA COMMUNITY
Kevin Hovey and Dominique Rissolo 261

BOOK REVIEWS 177, 219, 226, 248, 258

GUIDELINES FOR AUTHORS 277

ETHNOBIOTICA

Ethnobiology was interdisciplinary before being interdisciplinary became fashionable. Yet for many people, the meaning of ethnobiology remains enigmatic. From tropical forests to Arctic tundras, in the environs of the lab, archive, and field, ethnobiology in practice seems to exhibit few spatial or temporal restraints. You will find it wherever relations between people and other organisms occur and where such relations are or have been described. Ethnobiology represents a slice of the subject matter in many fields (anthropology, botany, folklore, history, linguistics, pharmacology, psychology, zoology, and so on). It's eclectic in geographic and temporal scope, but not incoherent in terms of its internal, driving forces. Those driving forces are theories and methods from diverse disciplines, and the scholars and scientists who exemplify them in their work.

There are many journals without a society, and there are some societies without a journal. Ethnobiologists are fortunate in having both. Ethnobiology also appeals to a wide public interested in issues of conservation, environment, globalization, and the plight of folks who have both intellectual and utilitarian familiarity in their daily lives with a remarkable range of plants and animals. That mass appeal, in part, bespeaks a need for more and better training of scholars in ethnobiology. Whereas knowledgeable folks and their corresponding wealth of associated habitats and species undergo increased impoverishment, as the global economy has expanded toward but not in general benefitted them, salvage ethnobiology seems to be an ineluctable trend. If ethnobiologists as a bloc lack the political clout to increase the ante on the intrinsic value of folk knowledge and its associated biological richness, they can certainly continue documenting it in prehistory, history, and the present. Someday the valuable stakes in which ethnobiology as a field has invested may be more widely known and appreciated, the subject matter of textbooks for young and older readers alike, worldwide. That education could enhance the palpable prospects of remaining cultures, languages, flora, and fauna, whatever losses in these had been sustained today.

For ethnobiological documentation to be truly excellent, ethnobiologists should seek training in whatever field their research problems demand competence. A social anthropologist is likely to know more about Crow kinship terminologies (and to know that these are fundamentally unrelated to birds) than a myrmecologist, whereas the myrmecologist will likely be more acquainted with the properties of ant venoms. If both were ethnobiologists also, each might need something from the other. The social anthropologist might need data on ant phylogenetics, and the myrmecologist on ant sting rituals. Ethnobiology is a field with a journal and a society but generally speaking it is not a discipline (with departments, Ph.D. programs, and so on), a fact of life students often do not know beforehand. Perhaps ethnobiology should stay that way. It is one field where the term "interdisciplinary" is employed in an unmistakably bona fide way. As the Journal of Ethnobiology approaches its twentieth birthday (next year), I hope you will join me in celebrating the coherent diversity of our chosen field, as amply evidenced in the material herein.

Journal of Ethnobiology 19(2): 143-176 Winter 1999

IS THE *FRAILEJÓN* A LIFE FORM OR AN UNAFFILIATED GENERIC?: EXAMINING THE RANK OF AN ENDEMIC PARAMO PLANT

EGLEÉ L. ZENT AND STANFORD R. ZENT
Departamento de Antropología
Laboratorio de Ecología Humana
Instituto Venezolano de Investigaciones Científicas (IVIC)
Ado. 21827, Caracas 1020A, Venezuela

ABSTRACT.– The debate over the distinction between life form and generic ranks provides the theoretical backdrop of this article. The case of the ***frailejón*** folk botanical taxon is described and an attempt is made to define its rank. The ***frailejón*** refers to a group of endemic plants of the high altitude paramo ecosystem (between the timberline and the permanent frost zone, 2,800 to 4,700 m a.s.l.), distributed throughout the northern Andes mountains of South America. The center of origin and dispersion of this botanical group is the Venezuelan paramo, the precise location of the fieldwork upon which this article is based. Ecological and floristic characteristics of the paramo environment are described and the Paramero people's identification, classification, nomenclature, use, and ecological association of the ***frailejón*** are reviewed. The evidence shows that the ***frailejón*** category is botanically polytypic and displays perceptual and taxonomic aspects of both life form and generic ranks. The high salience of this plant from morphological, utilitarian, and ecological points of view may help to explain this structural complexity. This case calls into question the validity and universality of a sharp distinction between the two ranks.

Key words: paramo, ***frailejón***, ethnobiology, folk biological range, Andean flora.

RESUMEN.– El contexto teórico de este artículo gira alrededor del debate sobre la distinción entre los rangos genérico y forma de vida etnobiológicos. Un intento por definir el rango del taxón etnobotánico ***frailejón*** permite la incursion de los autores en el debate mencionado. Se conoce como ***frailejón*** a un grupo de plantas endémicas del ecosistema de alta montaña tropical páramo (entre la línea contínua de bosques y la nieve permanente, 2,800-4700 m.s.n.m.), el cual se extiende a lo largo de los Andes del Norte de Suramérica. El centro de origen y dispersión de este grupo botánico se localiza en los páramos venezolanos, justamente donde se llevó a cabo el trabajo de campo del que provienen los datos de este artículo. Se describen aquí las características florísticas y ecológicas del ambiente páramo, además de detallarse los rasgos de identificación, clasificación, nomenclatura, uso y asociaciones ecológicas destacadas por los habitantes del páramo con respecto al ***frailejón***. Nuestros datos muestran que la categoría ***frailejón*** es botanicamente politípica, además de presentar aspectos perceptuales y taxonómicos de tanto el rango genérico como del de forma de vida. Tal complejidad estructural podría verse explicada mediante el alto grado de conspicuidad de este taxón desde diversos puntos de vista, morfológico, utilitario y ecológico. De esta manera se cuestiona la validez de una distinción discreta universal entre los dos rangos.

Palabras clave: páramo, ***frailejón***, etnobiología, rango etnobiológico, flora andina.

RÉSUMÉ.-- Le débat sur la distinction entre les formes de vie biologique et les rangs génériques sert de toile de fond theorique a cet article. Nous y décrivons le cas du taxon ethnobotanique **frailejón** et essayons de definir son rang. Le frailejon se réfert à un groupe de plantes endémiques de l'écosystème de haute altitude paramo (entre la ligne superieure de la foret et la zone de neige permanente, 2800-4700 m), dispersé à travers les Andes du Nord de L'Amérique du Sud. Le centre d'origine et la dispersion de ce groupe botanique sont situés dans le paramo vénézuelien, précisément là où a été menée la recherche sur laquelle est basé cet article. Les caractéristiques écologiques et floristiques de l'environnement du paramo y sont décrites et l'identification, la classification, la nomenclature, l'utilisation et l'association écologique y sont passées en revue. Nos données indiquent que la catégorie **frailejón** est botaniquement polytypique et présente également les aspects perceptuels et taxonomiques aussi bien des formes de vie biologique que des rangs génériques. L'importance de cette plante du point de vue morphologique, utilitaire et écologique peut peut-être expliquer cette complexité structurelle. Ce cas met donc en doute la validité et l'universalité de la forte distinction entre les deux rangs.

Mots clés: paramo, **frailejón**, ethnobiologie, registre ethnobiologique, flore andine.

THEORETICAL BASIS OF LIFE FORM AND GENERIC RANKS

The concept of rank is a central element in most theoretical formulations of folk biological classification (Glick 1964; Berlin et al. 1973, 1974; Berlin 1972, 1976, 1978, 1992; Bulmer 1970, 1974; Kay 1975; Hunn 1976, 1977, 1982, 1987; Brown 1977, 1979, 1984, 1987; Randall and Hunn 1984; Randall 1987; Wierzbicka 1985; Atran 1985, 1987, 1993; Atran *et al.* 1997). The theory of Brent Berlin (1992) describes a hierarchical organization of biological taxa into a minimum of three and a maximum of six major ethnobiological ranks, and this basic taxonomic structure has been confirmed for a considerable number of cultures (cf. Brown 1984). Ethnobiological ranks are conceived as being analogous to the ranks found in systematic biology, in which taxa occupying the same rank are mutually exclusive. The following ranks, ranging from most to least inclusive, have been recognized: kingdom, life form, intermediate, generic, specific and varietal. Taxa of the same ethnobiological rank usually (but not always) occupy the same level in a particular taxonomic structure (Berlin *et al.* 1973:215; cf. Atran 1993:53).

While the notion of rank is an intuitively appealing organizing concept for explaining the obvious hierarchical structures observed in most (if not all) ethnobiological classification systems, the ontological, epistemological, logical, perceptual, and biological status of ethnobiological ranking behavior in general and of some of the individual ranks in particular have been a matter of considerable debate and disagreement among the principal proponents of ethnobiological theory. The discussion about the naturalness, intellectual motivation, functionality, and definitional borders (i.e. intentional and extensional limits) of life form and generic categories has been especially lively and tendentious, marked by several competing points of view.

According to Berlin (1976, 1992), ranks are nonarbitrary and psychologically

real (i.e. not a mere cataloguing device imposed on the data by the analyst), and correspond to distinctly bounded groupings of ethnobiological taxa at different levels of psychological and biological reality according to similar or comparable internal degrees of variation within a category and external degrees of separation between categories. His view of rank makes clear that the ethnobiological domain is discretely partitioned by the folk taxonomist and not perceived in terms of continuous variation. The high degree of correspondence between native genera and scientific species is offered as partial proof of the objective reality of natural discontinuities encoded in folk classifications, whereas instances of noncorrespondence are attributed to external influence by the cultural domain (Berlin 1973). Life form (e.g. tree, vine) is defined as the second most inclusive rank, broadly polytypic, encompassing a few morphotypes, recognized on the basis of a small number of biocharacters, and perceptually natural although it frequently crosscuts phylogenetically valid natural categories, such as Family. The generic category (e.g. oak, maple) is considered the nucleus of the classificatory system, typically the most numerous category, the first recognized by children, implying the naturalness and effortlessness with which it is discriminated, named by primary lexemes, and mostly monotypic. Whereas most folk generics are observed to be taxonomically included within taxa of life form rank, a minority of folk generics appears to be conceptually unaffiliated to life forms. Berlin accounts for the taxonomic irregularity of the unaffiliated generics as resulting from morphological aberrance (e.g. bromeliads) or special economic importance (e.g. cultigens) (Berlin 1974, 1992).

An early alternative viewpoint to the universalist, intellectualist and objectivist perspective of Berlin was offered by Ralph Bulmer, who endorses an integral ecological model of folk biological classification in which the importance of the specific cultural and natural environment in determining the taxonomic space is emphasized (Bulmer 1974:11-2). He considers the higher inclusive taxa (Berlin's life forms) as largely variable in configuration because local cultural as well as perceptual criteria are used to construct the categorizations. In other words, the generative criteria of categories – cultural significance, use patterns, and ecological relationships in addition to morphology and behavior – do not produce pancultural patterns because they are dependent on culturally and ecologically specific circumstances which are numerous and variable (Bulmer 1974:20, 1967:6). The highly inclusive taxa are regarded as logically natural, but they may not always be biologically natural (Bulmer 1970:1087; cf. Hunn 1987). Instead, Bulmer argues that biologically natural reality is more closely reflected by the lesser inclusive taxa which he labels the "specieme," defined as the smallest perceptible natural discontinuities differentiated lexically. This minimal natural unit is described as being segregated not by single characters but on the basis of multiple overlapping definitional criteria: morphological salience, habitat, and behavioral habits such as nourishment, reproduction, etc. (Bulmer 1967, 1970, 1974). This definition is nearly identical to Berlin's concept of the folk generic.

Eugene Hunn (1976) rejects the strict taxonomic framework and instead elaborates a more flexible and process-oriented perceptual model of folk biological classification, which considers the structural complexity (e.g. taxonomic anoma-

lies, like taxonomic structures) and variability of folk biological classification systems to be the product of the empirical perception of the classification space in different environments. Life form and generic categories are distinguished by essentially different perceptual processes: deduction and induction respectively. The life form category results from deductive processes in the sense of being monothetic, defined by a few abstract features, arbitrary, special-purpose, and artificial in a biological sense. By contrast, the generic category involves induction in being polythetic, a gestalt (i.e. whole image) pattern abstracted from the sharing of many concrete attributes, general-purpose, and natural in a logical sense. The natural perceptual salience of the generic is defined in algebraic terms as the higher critical ratio (CR) of a taxon or its higher inherent stimulus capacity [CR (t) > CR (t ± n), where ±n indicates a taxon including t or included within it] (Hunn 1976:518-527). Offering an explanation to the ponderable recurrent non-transitivity of certain reported taxa, Hunn argues that this definition of the generic in terms of CR permits a generic taxon to occupy different ranks depending more on empirical phenomena than on theoretical axioms: the non-finite boundaries of taxa are generated by the variable prominence (CR value) of the perceptions. The theoretical problem of the unaffiliated generic is thus resolved as "a situation in which the same taxon is both a generic and a life form ... i.e. if CR(x) < CR(y) < CR(z), x, z Ì y" (Hunn 1976:520).

Hunn (1987) later qualifies his position somewhat regarding the perceptual, biological and logical bases of the life form rank. He admits that some life form taxa, notably "grass", "bird", and "fish", display clearly inductive "configurational integrity" similar to folk generics whereas other life forms, such as "herb", "vine", "mammal", and "wug" are indisputably deductive and artificial in nature. Meanwhile, "tree" is considered to occupy an intermediate position in a logical and biological sense – that is, lacking the natural configurational integrity characteristic of folk generics but nevertheless perceptually compelling. This qualification implies that the perceptual and logical distinctions between life form and generic ranks are not as clear-cut as Hunn himself stated earlier, and instead the differences are more accurately conceived as a continuum ranging from artificial deduction at one pole to natural induction at the other. Thus the question of what rank a taxa should be assigned to may not be a simple either-or choice but rather a matter of degree of conformity to whichever pole.

Robert Randall and Hunn (1984), building upon Hunn's earlier perceptual model, argue that highly inclusive folk biological categories comparable in scope and function to life forms are motivated by recognition of functional (i.e. utility) and ecological (i.e. local biodiversity) criteria in addition to perceptual attributes (i.e. behavior, morphology), and therefore are culturally idiosyncratic constructs. Randall (1976:543-545, 1987) further elaborates his opposition to universalist and essentialist taxonomic thinking in stating that the structure of folk biological classification resembles a perceptual network based on the fuzzy logic of focal or prototypic categories with extended ranges rather than a rigid hierarchical scheme conceived vertically in terms of transitive set inclusion and horizontally as mutually exclusive classes. Prototypicality facilitates the grouping of different organisms sharing a range of features through inclusion at peripheral positions of the class

(i.e. categoric membership grading, central nucleus, and extended percepts; see also Gal 1973:206; Ellen 1975:221; Kempton 1978:44). Both higher inclusive and generic categories are said to be characterized by this focal-peripheral logical structure. Randall considers that generics frequently lack the attributes necessary for focal membership in a higher inclusive category and the so-called unaffiliated generics are those displaying unique uses and/or atypical perceptual attributes to the degree that they are completely outside the ranges of the higher inclusives.

Scott Atran, influenced by classic Aristotelian philosophy (cf. Mayr 1982; Ruse 1992), reaffirms the universalist, essentialist, and transitive taxonomic approach to ethnobiological ranking. He refutes Hunn in stating that life form and generic categories are equal in terms of deductive/inductive or monothetic/polythetic logical distinctions, largely because biotaxa of all levels pertain only to essences of kind (i.e. underlying nature) and not actual appearance. Logically necessary features are imposed on both sorts of taxa and hence there is no vagueness of boundaries at either level. Atran considers the difference between life-form and generic taxa as two-fold: the latter comprise subsets of the former and the life forms divide the conceptual categories of biological domains into a contrastive lexical field. As a result, the lexical system marking the life forms make up *fundamentum divisionis,* indicating a logical fractioning of the category into features that are "positive and opposed" along one or more perceptible dimensions. The generics, by contrast, are characterized by a conjunction of features, and thus in order to define a generic it is sufficient that the other generics lack one or more of its attributes. The partitioning of a living kind as a generic represents a logical *fundamentum relationis,* meaning a relational segregation of bioforms into specific configurations. Morphologically unaffiliated generics, also referred to as monogeneric life forms, display both divisional and relational segregational aspects and therefore are simply double indexed in taxonomic trees at life form as well as generic ranks (Atran 1985, 1993).

The preceding review of the ethnobiological literature makes clear that the concept of rank and in particular the distinction between life form and generic ranks is a topic of widely contrasting opinion. Major disagreements persist regarding the issues of the psychological reality, universality, functionality, transitivity, prototypicality, naturalness, and boundedness of folk biological ranks. Scientific acceptance of one or the other competing viewpoints will depend upon how well the theories conform to the empirical facts uncovered by further field investigations. Studies of endemic bioforms in geographically restricted and ecologically stressed biomes may be especially revealing here in the sense of testing the outer empirical limits of theoretical explanation by giving due consideration to the so-called special or exceptional cases. Accordingly, the present article considers the case of the ***frailejón*** folk taxon among Venezuelan Paramero peasants in the context of the debate on ethnobiological rank. We consider the ***frailejón*** to be especially pertinent to this debate because it appears to display diverse perceptual, logical, and biological features which have been associated with both life form and generic ranks. Thus our specific aim is to describe what these features are and analyze whether the ***frailejón*** should be defined as a life form or an unaffiliated generic.

DESCRIPTION OF THE PARAMO VEGETAL BIOTYPES: THE CAULIRROSULA

The high altitude ecosystem known as ***páramo*** in the northern Andes exhibits a unique vegetation of about 3,000-4,000 species of vascular plants, of which 60% are considered to be endemic (Luteyn 1992:6). Although there are different definitions of paramo, based on floristic, geomorphological, climatic, physionomic and human features (see López 1993, 1995 for different notions of paramo), plants are one of the most conspicuous features and not surprisingly constitute one of the diagnostic criteria for distinguishing this tropical high mountain zone. The recurrent presence of certain botanical types throughout the paramo habitat points to the high biological potentiality in terms of species richness (Cuatrecasas 1968:165) as well as the ecological restrictiveness in terms of mophophysiological development. The most common life forms are: Caulirrosula (caulescent rosette), Cryptofrutex (partially hidden, dwarf or prostrate woody shrub), Herba (herbaceous plant), Fascigramina (bunch grass), Proteretum (mat or cushion plants such as moss, lichen and hepatica), Arbor (tree, usually small or even dwarfed but with distinct trunk and crown), Frutex (woody shrub) and Suffrutex (subshrub: woody at the base, herbaceous above) (Cuatrecasas 1968:166-69; Heldberg 1992:15; Monasterio 1980:22; Troll 1968:29; Lauer 1979:33).

The botanical element is clearly emphasized in biogeographical descriptions of the paramo as a high open humid region characterized by the dominating presence of tussock, cushion and rosette plant communities (Lauer 1979:29-30). These vegetationally distinct landscapes are discontinuously distributed in high elevation islands, between 2,800 and 4,700 meters above sea level (Vuilleumier 1979:186; Monasterio & Vuilleumier 1986:3), mainly throughout the Northern Andes of South America (Lauer 1979:29; Azocar 1980:16) but with sparser formations extending to Costa Rica in the north (Cordillera de Talamanca, 11° N) and to Huánuco province, Peru in the south (8° S). Isolated paramo biomes are also found in Panama, on the humid eastern Andean slopes of Peru and Bolivia (Cleef 1978:367) and atop ***tepuy*** (tabletop sandstone mountain) formations in the Guiana Shield (Cleef 1983). Moreover, high mountain regions similar in ecological structure and function to the paramos can be found between the Tropics of Cancer and Capricorn on all continents: the Central Andes (punas), East Africa (afroalpine level), Malaysia, Hawaii, and New Guinea (tropical-alpine level; Troll 1968:29; Lauer 1979:29; Monasterio 1979:117; Monasterio & Vuilleumier 1986:3). It should be mentioned, however, that studies carried out in the Colombian and Ecuadorian paramo have raised questions about the origin of this biome, whether natural or human-made (cf. Balslev & Luteyn 1992; Lægaard 1992; Verweij & Beukema 1992). Specifically, observations of vegetational dynamics in response to fires and grazing give some weight to the hypothesis that human activities are partly responsible for shaping this particular environment (Ramsay & Oxley 1996).

Paramo plant types are commonly characterized by a number of special morphophysiological features that crosscut phylogenetic lines and are thus explained as resulting from adaptive convergence to the stressful climatic conditions prevailing in this environment (Jahn 1931:105; Billings 1974:403; Mani 1980: 127).

Significant climatic parameters include: considerable diurnal fluctuation of temperature (up to 25°C difference between minima and maxima), ocurrence of frost, dry atmosphere, high intensity and rapid change of ultraviolet solar radiation, and strong winds. Such conditions, along with highly drained soils, exacerbate the potential dehydration of plants and therefore select for species with persistent foliage and xeromorphic structure, despite the constantly humid weather (Pittier 1929:29; Tamayo 1958:13-15; Cuatrecasas 1968:165; Heldberg 1992:21). High humidity is in fact largely offset by high solar radiation and low atmospheric pressure, and consequently the vegetation cover is specifically designed for efficient absorption and storage of water (Guhl 1982:43-44). The high rate of evapotranspiration induces the slow and stunted growth of many plants – for example, internodal spaces are often shorter (Pittier 1929:29; Jahn 1931:105; Troll 1968:30), and also exerts selective pressure on leaf size, shape, and structure. In regards to the latter, common morphological traits include: spiral arrangements; spatulate, obovate or oblanceolate overall shapes; lobed or dentate margins; broad apices; pinnate venation; pubescent or tomentose surfaces; coriaceous (i.e. leathery) texture; and thickened epidermic cells (Pifano 1961:124; Guhl 1968:208; Mani 1980:130; Azocar 1980:19). Especially common are the so-called "dwarf" and other low volume species as well as plant types growing very close to the soil (especially in rocky sites) in order to maximize the capture of heat energy (Budowski 1968:157), as is typical of cushion, cespitose (i.e. tufted), and acaulescent (i.e. stemless) plants.

The morphophysiological traits mentioned above overlap not just diverse phylogenetic classes but also different geographical regions, being most prevalent in the provenance zones of the contemporary paramo species. Evidence of open habitats populated by paramo-like vegetation is found in pollen data of the Middle Eocene (Van der Hammen & Cleef 1986:172). However, it is believed that the most likely direct precursors of paramo vegetation evolved as early as five million years ago in the Early Pliocene (Van der Hammen & Cleef 1986:173). The first indications of a definitely paramo vegetation date to the Late Pliocene or Early Pleistocene geological periods, around 1.9 million years ago (Van der Hammen 1979:55; Van der Hammen & Cleef 1986:175, 182), and point to a neotropical origin. Later, botanical traits originating from the holartic or austral-antarctic regions appear on the scene (Van der Hammen & Cleef 1986:175; Monasterio 1980:22). Both groups of plants successfully adapted to the paramo environment, the neotropicals to the low temperatures and the holartics/austral-antarctics to the tropical thermal regime, in which the diurnal range of temperature far exceeds the annual range.

It is the neotropical Caulirrosula life form (perennial caulescent rosette) that is of most interest to us here. The presence of this plant type distinguishes the high elevation ecosystems of the tropics from those of the temperate latitudes (Smith 1981:1). Smith (1981) affirms that it evolved independently in the high mountain belts of Eastern Africa (*Senecio, Carduus,* and *Lobelia*), South America (*Espeletia* and *Puya*), Hawaii (*Argyroxiphium*), and New Guinea (*Cyathea*), but is not found in the extra-tropical highlands. In the Northern Andes, it is represented primarily by members of the genus *Espeletia* (Asteraceae), and is deemed the most distinctive biotype of the paramo biome (Cuatrecasas 1968:167, 1979, 1976:43-4). This plant appears in the form of large rosettes (10 to 100 cm diameter), with whitish-grayish

to yellow-gold, pubescent to tomentose (although a few species are glabrous), densely basal or radical oblanceolate leaves (10 to 70 cm long, 3 to 50 cm broad), and with usually yellow (although orange-reddish in some species) scapose and bracteolate flowers. They are either acaulescent or erect (unbranched woolly trunks), reaching heights up to 10 meters in undisturbed paramo. The Caulirrosula is also represented by some plants of the genus *Puya* (Bromeliaceae) but its presence in the paramo is less common than *Espeletia*.

The genus *Espeletia* displays an extraordinarily high degree of diversification and endemism, comprising about 150 species (Luteyn *et al*. 1992:74). As more specimens of this group of plants were collected, analyzed and described by José Cuatrecasas (1934, 1954), the leading taxonomic expert of the group, significant differences in habit and inflorescence were discovered and consequently the group was reclassified into seven distinct genera based on the differential sharing of certain floral, fruit and other characters. The entire grouping was then reconsidered as a new sub-tribe, the Espeletiinae (Helianthae tribe, Asteraceae family; Cuatrecasas 1976:47). The seven genera (*Carramboa, Tamania, Libanothamnus, Ruilopezia, Coespeletia, Espeletiopsis, and Espeletia*) correspond to various taxonomically significant growth forms: three types of trees, four categories of acaulirrosula (acaulescent rosette), and two kinds of caulirrosula (one of which is subdivided into two types). The latter group includes the most characteristic "form of ***frailejón***" (Cuatrecasas 1976:45; Robinson 1981:35):

> The biotype of 'caulirrosula' with short or long stem, is the most characteristic feature of the plant life of the high tropical mountains. It accounts for the physiognomy of the most part of the paramo vegetation (Cuatrecasas 1976:46).

The Espeletiinae inhabit an area stretching about 1,700 km from Llanganatis, Ecuador to El Avila, Venezuela, with the largest concentration of taxa being found in the Sierra Nevada de Mérida in Venezuela (Cuatrecasas 1986:274). All seven genera, four of which are endemic, as well as 65 endemic species are found in the Venezuelan Andes alone (see Figure 1). Thus biogeographical evidence supports the hypothesis that this latter area corresponds to the center of origin and dispersion of this botanical sub-tribe (Cuatrecasas 1986:275; Robinson 1981:35). The genus *Polymnia,* which typically inhabits tropical mountain forest zones, is believed to be ancestral to the sub-tribe. *E. neriifolia* Sch. Bip., one of the 15 arborescent forms with a currently wide distribution, has been identified as the most primitive member (Smith 1981:2).

Sometime during the Pliocene or Pleistocene, the Andes reached their present height (Schubert & Vivas 1993:29, 307; James 1975:62-63; Vuilleumier & Ewert 1978) and probably about the same time an ancestor of the Espeletiinae evolved "along the Venezuelan Andes" (Cuatrecasas 1986:275). Early to Middle Pleistocene sediments from the Venezuelan High Andes have been analyzed for paleoecological reconstruction (Rinaldi 1993:200; Salgado-Labouriau 1986:203). The principal sources of pollen and spores from this period are the Asteraceae and Gramineae, including members of the Espeletiinae. It is believed that the proto-Espeletiinae were perennial, evergreen, woody, shrubby, branched, and had xeromorphic foliage (Rinaldi

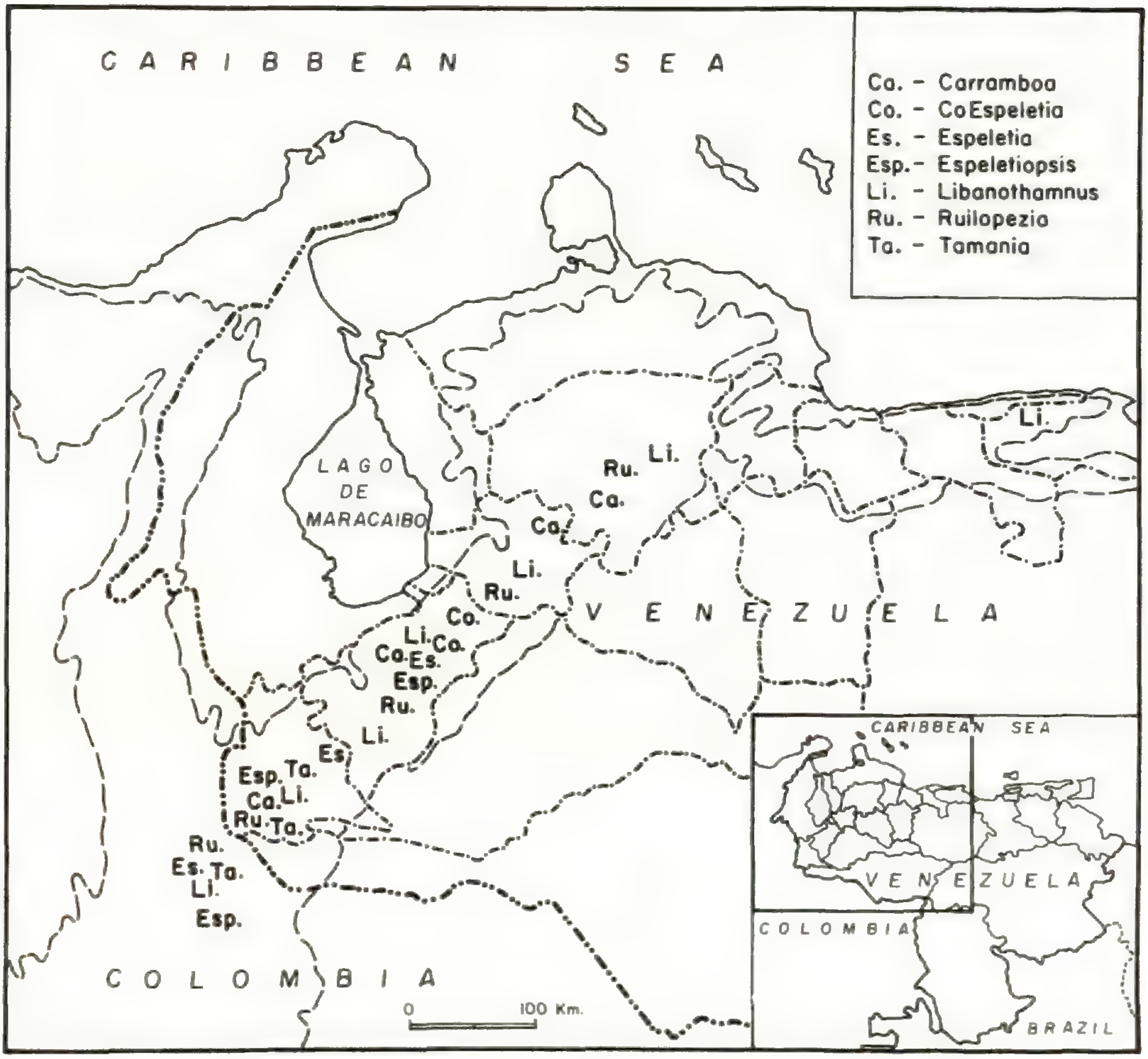


FIGURE 1.– Geographic Distribution of the Espeletiinae Sub-Tribe.

1993:201-202). Isolated islands of paramo environment were probably invaded by a proto-Espeletiinae, "presumably by genotypes of arborescent forest species similar to *E. Neriifolia*- producing numerous isolated populations. This comparative isolation combined with new selective forces imposed by the paramo environment, apparently contributing to extensive speciation" (Smith 1981:3).

The seven genera of the Espeletiinae exhibit various bioforms and occupy confined areas. The genus *Tamania* for example is monotypic and restricted to very particular areas; it consists of medium-sized trees and is found only in the paramo of the Tamá-El Cobre massif (Cuatrecasas 1986:275) on the Venezuelan-Colombian border. Seven arboreal species belonging to the genus *Carramboa* are restricted to the cloud or humid mountain forest of the Mérida Andes (Cuatrecasas 1986: 286) in the States of Trujillo, Mérida, Lara, and Táchira in Venezuela. The genus *Libanothamnus* is characterized by trees of xeromorphic structure and shows a very wide distribution, from the Colombian Tamá paramo, throughout the whole Venezuelan Andean Cordillera, and even appearing in the Venezuelan Coastal Cordillera. The characteristic form of *Ruilopezia* is a branched or monocarpic

caulirrosula and it is restricted to the ecotone between the paramo and the montane forests, with the exception of four species that inhabit open paramo, from Lara State, Venezuela in the east to the Colombian border in the west (Cuatrecasas 1986:281). The genus *Coespeletia*, described as a polycarpic (i.e. producing multiple fruits) caulirrosulan biotype, is endemic to Mérida State, Venezuela with some species adapted to the dry desertic paramos (Cuatrecasas 1986:298). The *Espeletiopsis* are also characterized by the caulirrosula form, but some individuals reach up to 12 meters, "raising their sclerophyllous rosette to the top of the canopy" (Cuatrecasas 1986:283), in cloud forest, whereas others grow mostly in the more open paramos. Finally, the *Espeletia*, which is of prime concern to us here, is "the most representative genus of the ecological concept of paramo" (Cuatrecasas 1986:288). *Espeletia* is a gregarious genus specially adapted to cold and humid habitats, developing best in the paramo proper even though it has a low reproductive rate. It usually appears as the dominant species in altitudinally or topographically circumscribed, spatially segregated communities (e.g. at the top of peaks), which over prolonged periods may thus differentiate into sub-species or new species (Cuatrecasas 1986; Sturm & Rangel 1985; Smith 1981; Robinson 1981). About 45 species of *Espeletia* are reported for the Mérida paramos (Vareschi 1970:293), which correspond to the area of fieldwork described in this article. Some of these species are endemic to localized areas and others also exhibit a very restricted distribution.

RESEARCH SITE AND FIELD METHODS

The fieldwork on which this research is based took place in two glacial valleys in the paramo mountain level ranging from the timberline to the border of the snowcap. The two localities are situated in the northernmost part of the Northern Andes in the Mérida Cordillera, Venezuela (7°30'-10°10' N and 69°20'-72°50' W; Schubert 1980:29), which is divided into a Northern Range (Culata) and a Southern Range (Nevada) (see Figure 2). The first locality, the Las González valley (3100-3800 masl) in the Conejos paramo extends seven kilometers and is located in the northwest sector of the Northern Range. In 1988, the valley had a resident population of 144 people distributed among 22 dispersed homesteads. By 1992 some families had emigrated to another mountain valley or closer to the city of Mérida, and the population was reduced to 84 people. The second locality, the Micarache valley (3000-3700 masl), located within the Llano del Trigo paramo in the south-central part of the Southern Range, is about six kilometers long and is home to 75 people grouped into 12 family compounds. Environmentally, both valleys display the characteristic glacial and periglacial features common throughout the paramo habitat (Schubert 1980). Culturally, the people are monolingual Spanish-speaking peasant farmers who maintain a traditional paramo subsistence-oriented lifestyle, although some market participation has recently been adopted.

The contemporary human inhabitants of the paramo, known as ***Parameros***, display a cultural pattern which is likely the result of syncretization processes between Indian and Hispanic populations. The permanent (i.e. year-round) prehispanic human presence in the Venezuelan paramos has not yet been conclu-

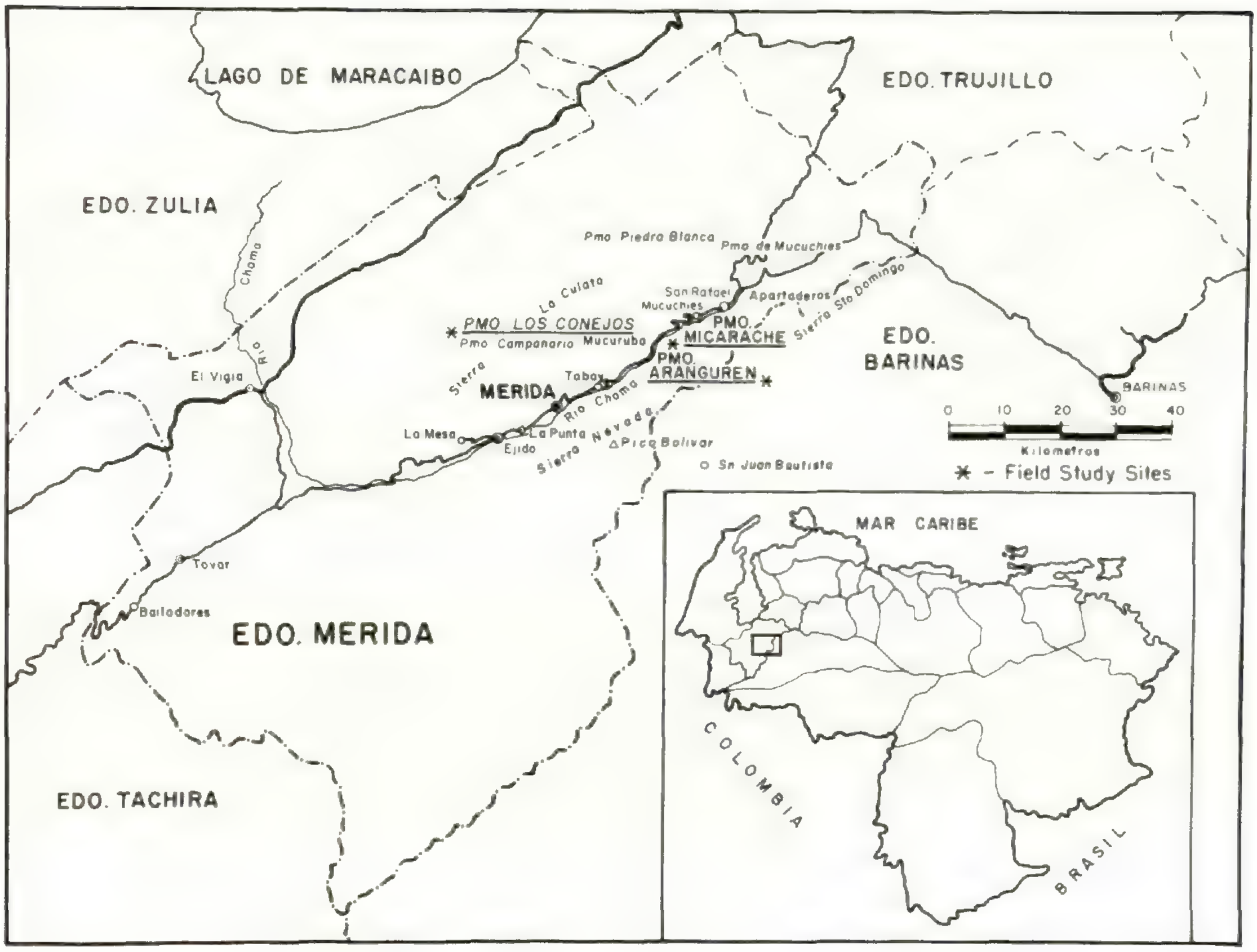


FIGURE 2.– Map of the Field Study Sites and Surrounding areas.

sively demonstrated, but archaeological (Wagner 1967, 1973; Rivera 1992), ethnohistorical (Rodíguez Xuarez 1558; AH Mérida 1791, 1803, 1804, 1806, 1807 and 1837; Simón 1627) and ethnographic data (López 1992) confirm at least a very longstanding seasonal human presence. One may infer the survival of Indian traits mixed with Hispanic cultural features among contemporary Paramero people, especially in regards to subsistence strategies and speech habits (i.e. antiquated Spanish dialect laced with some indigenous-derived lexical items) (López 1992). The Parameros traditionally maintained a subsistence-based economy and this emphasis has changed little except that some cash-cropping is now practiced. The main economic activities include field agriculture (with potatoes as the main crop plant), dooryard gardening (secondary crops, medicinal plants, and flowers), cattle husbandry (on a very small-scale, with no more than a few animals per family), occasional fishing (primarily trout), and the gathering of a wide variety of wild plants (mostly for local consumption or occasionally for sale). The construction of paths, lodgings, fences, and plows are important ancillary activities.

The first author carried out intensive fieldwork from March to August 1988, dividing her time between the two sites mentioned in rotating stays of 3-4 weeks. Both authors participated in a follow-up study in December 1992 and again in June 1998, which were limited to the Las González community. The research consisted mainly of botanical collections and systematic interviews with 90 people of different sex and age groups, 60 in the Las González community and 30 in

Micarache. Additionally, 40 children aged four to 12 (18 girls and 22 boys) from these two localities and another paramo community, Gavidia (Southern Range), were interviewed individually about the most salient paramo plants. Three kinds of data were thus obtained: botanical material (plant specimen collections), oral ethnographic data (interviews about ethnobotanical topics), and behavioral ethnographic data gathered through daily participant observation with the Parameros. A total of 1121 botanical samples were collected with 23 paramero collaborators in the Northern Range and 27 collaborators in the Southern Range. The samples were deposited in the Manuel Ovalles Herbarium at the Venezuelan Central University and have been partially identified by the curator, Stephen Tillett. The interviews account for the core of the data on which the present paper is based and covered a range of ethnobotanical topics and techniques: free association listing of plant names, recording of nomenclature and activity signatures during plant collection trips, queries about the morphological characters and ecological ranges of particular plant types, and free ranging conversations dealing with plants held within the household compounds. In addition to direct questions about particular plants, the Parameros were also asked to define the paramo environment, through a set of circumscribed questions such as: "What is the paramo?", "What characteristics of the environment (landscape, animals, plants, etc.) define the paramo?", "Where does the paramo begin? and end?". All but one Paramero (98.9%) mentioned the ***frailejón*** as *the* most characteristic environmental feature, in reference to the entire range of salient features (and not just botanical parameters) of this ecosystem.

From the beginning of fieldwork, it became evident that the Parameros are well acquainted with the extreme climatic conditions of the paramo (wide daily temperature fluctuations, frost, constantly high humidity, etc.) and how these influence or nurture particular plants that grow almost exclusively in this environment. Plant gathering is a daily activity among the Parameros and most people possess an impressive knowledge of a large number of the plants inhabiting their local environment. No significant differences in plant knowledge according to gender were detected, although systematic comparisons were not made. Although there is no formal method of teaching local botanical knowledge, the elderly impart their wisdom to the younger generation during trips moving livestock to new grazing ranges, working distant farm lots, and plant gathering excursions. The latter activity is oriented to finding plants for household use and for sale in rural and urban markets, where considerable demand exists for certain specimens, especially medicinal plants.

PARAMERO CLASSIFICATION OF THE *FRAILEJÓN*

Analysis of the data supports the belief that the daily close contact of the Parameros with plants stimulates alternative ethnobotanical classifications organized on the basis of three distinct semantic dimensions: morphological, ecological (or contextual), and utilitarian. This three-part classification system reflects the different ways that plants can be cognitively distinguished or associated and is productive and flexible by nature, thus easily permitting the people to situate (or add) any plant (including new ones) they encounter within their botanical

encyclopedia. All Parameros possess a basic or core knowledge of their plant environment, meaning that a large number of plants are commonly identified and named by everyone. However, this basic knowledge is mediated by an individual's particular life experience with the flora (López 1991).

The ***frailejón*** is the first plant group learned and apprehended by children. It was among the first five kinds of plants mentioned by 87% of the 40 children interviewed, and among the first 10 plants stated by all respondents. Furthermore, the ***frailejón*** was also considered to be the single most representative plant of the "paramo proper" habitat. We hypothesize that the extreme overall salience of this plant is enhanced by the combined effect of it being regarded as simultaneously salient on morphological, utilitarian, and ecological grounds. Thus the ***frailejón*** is cognitively outstanding due to its highly distinct form, multiple uses in the Parameros´ everyday life, and floristic conspicuousness (i.e. numerical dominance within the vegetal community). Almost the entire sample of adults interviewed underlined its pronounced importance from all three points of view. The classification of the ***frailejón*** from each point of view and the significance of each dimension for the rank determination of this folk botanical category will be considered next.

Morphological Classification.– According to Paramero oral tradition, the group of plants called ***frailejón*** acquired its name as a result of its perceived similarity to a friar walking partially hidden by the fog or mist. As this etymological tale would suggest, it is our argument that the ***frailejón*** taxonomic group is perceived by the Parameros as a complex yet unitary (i.e. gestalt) image, thus similar to the way folk generics are normally perceived. At the same time, however, other cognitive features of this class suggest it corresponds to the rank of life form. We argue that one reason for this case of cognitive complexity (and indeed ambiguity) is the fact that perception of group distinguishing morphological features actually occurs at two levels of abstraction. On one hand, the Parameros recognize global attributes such as size, shape, and texture that correspond to abstract attributes (cf. Hunn 1976:509) and usually define segregates of larger inclusivity. We contend that this process (deduction) generates the ***frailejón*** category as a *fundamentum divisionis* (Atran 1993). The second level focuses on the concatenation of unique structural parts of the plants, like flowers or inflorescence, pubescent or tomentose leaves, stemless (acaulescent) or ligneous stems (monocaule), succulence and depth of roots or rhizome, as well as altitude above sea level where the plant habitually grows. The referential features here are equivalent to concrete attributes (Hunn 1976) and usually generate segregates of lesser inclusivity corresponding to the minimal discontinuities in nature (cf. Berlin *et al.* 1974) of the conceptual form described as *fundamentum relationis* (Atran 1993). However, we intend to show that such relational (or inductive) processes also form a core part of the organization of the ***frailejón*** taxon in a higher inclusive sense. In sum, our analysis of the ***frailejón*** as a morphology-based folk botanical taxon identifies both divisional and relational conceptual processes as responsible for the category generation.

The taxonomic status of ***frailejón*** in relation to the other higher inclusive rank categories of the Paramero botanical classification system clearly suggests its placement at this higher taxonomic level. The Paramero life forms uncovered by the

present research include five taxa which have been commonly reported in the ethnobotanical literature (cf. Berlin *et al.* 1973, 1974; Brown 1984): ***árbol*** 'tree', ***arbolito*** 'small tree or bush', ***bejuco*** 'vine', ***yerba*** 'herb', and ***pasto*** 'grass'. Two other culture-specific categories, ***frailejón*** and ***díctamo***, are not included within any of the aforementioned taxa, but are classified during free association list exercises as kinds of ***mata*** 'plant', the named unique beginner of the domain. Thus from a purely taxonomic perspective it appears that ***frailejón*** and ***díctamo*** correspond to the life form rank level. Nomenclatural and biological evidence also support this conclusion. Consistent with previous formulations of the hallmark characteristics of the life form rank (Berlin 1992), these taxa are named by primary lexemes and constitute classes composed of highly polytypic and biologically divergent organisms. In addition to these higher inclusive taxa, several unaffiliated generics have also been identified: ***caña*** 'cane', ***musgo*** 'moss', ***paja*** 'straw', and ***papa*** 'potato'. However, the degree of polytypicality within these latter categories is notably smaller.[1]

The considerable polytypicality and biological divergence of members within the ***frailejón*** class has been proposed as partial evidence of its status as life form rank. Figure 3 provides a taxonomic schematic representation of the internal differentiation of the class as well as the correspondence of folk to scientific taxa. From a folk standpoint, the group is divided into at least 20 different named segregates at the first descending taxonomic level, while five of these categories show further differentiation into subtypes on a still lower taxonomic level for a total of 27 terminal taxa. Meanwhile, this same inventory of plants is classified by scientific systematic botanists into at least five genera: *Espeletia, Gnaphalium, Lucilia, Oritrophium* and *Paragynoxis,* all in the Asteraceae family, the last three kinds being of neo-tropical origin (Asteraceae; Luteyn *et al.* 1992:74). Four of these genera (all but *Paragynoxis*) are in turn polytypic. The *Espeletia* group is especially diverse, with thirteen distinct species being represented here. It is interesting to note some departures in the correspondence of folk to scientific taxa. Five species of *Espeletia* (*E. weddelli, E. moritziana, E. aurantia, E. lindenii,* and *E. spicata)* are mildly overdifferentiated (into two or three folk segregates per scientific species). On the other hand, underdifferentiation of scientific species and genera is observed in just two terminal folk taxa, ***frailejón morado*** (three species of *Orithrophium*) and ***frailejón amarillo grande*** (two species of *Espeletia*).

In addition to the included taxa mentioned above, three other segregates (***viravira, familia del frailejón,*** and ***sin nombre*** 'no name') are tentatively grouped under the ***frailejón*** folk category in figure 3 (marked with the broken lines). The first of these refers to members of the genera *Icurtegia* and *Gnaphalium,* whereas the latter two were identified as corresponding to the genus *Senecio*. However, this inclusion refers only to a qualitatively more distant (i.e. extended range) connection, based on the fact that the informants refrained from directly calling them ***frailejón***, but did expressly recognize some degree of affinity through statements such as: "***esa es familia del frailejón***" 'that belongs to the family of the ***frailejón***', "***o sea que van juntas porque son del mismo familión***" 'they go together because they belong to the same family', and "***esas son la misma cosa***" 'they are the same thing'. These extended range taxa are cited here as providing partial evidence in support of our claim that the higher inclusive category in fact constitutes a graded or fuzzy set class.

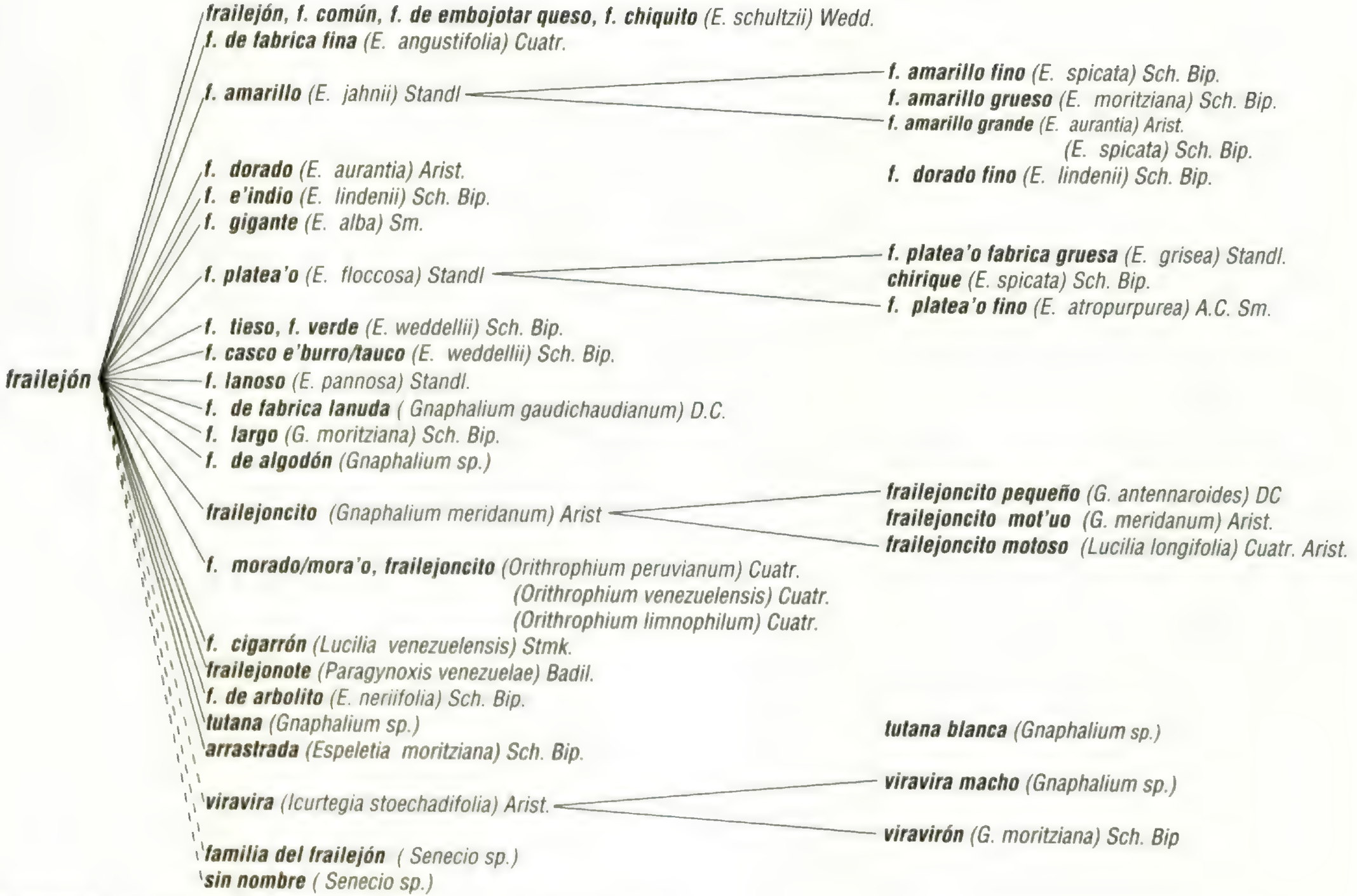


FIGURE 3.– Taxonomic Representation of the ***Frailejón*** Folk Category

Nomenclaturally, the entire class can be designated by the primary lexeme of ***frailejón***. At a lesser inclusive level, ***frailejón*** also names the class prototype or focal taxon, identified botanically as *Espeletia schultzii*. This taxon may also be called ***frailejón común, f. chiquito***, or ***f. de embojotar queso***, but this binomiality is optional and it is more commonly omitted. We have designated this taxon as the class prototype due to the fact that a large number of our ***paramero*** collaborators explicitly identified it as the "true ***frailejón***" or "proper ***frailejón***". The other lesser inclusive taxa are named by simple unproductive primary lexemes (e.g. ***arrastrada, tutana, tauco***, and ***chirique***),[2] complex productive primary lexemes (e.g. ***frailejóncito*** and ***frailejónote***),[3] secondary lexemes (e.g. ***f. amarillo, f. dorado, f. e'ìndio,*** etc.), unnamed or covert categories (***familia de frailejón*** and ***sin nombre***), and tertiary lexeme constructions (e.g. ***f. amarillo fino, f. amarillo grueso, f. amarillo grande***, etc.). Nomenclature is not, however, a consistent indicator of taxonomic level since both primary and secondary lexemes contrast at the first lower inclusive level, whereas primary, secondary, and tertiary lexemes contrast at the lowest inclusive level. Furthermore, the primary lexeme ***frailejóncito*** is actually polysemous, referring in one case to a polytypic class composed of species of the *Gnaphalium* and *Lucilia* genera and in the other case to the monotypic taxon also known as ***f. morado***, made up of various species of the *Orithrophium* genus.

A strictly taxonomic model of the ***frailejón*** group, as depicted in figure 3, underestimates the true complexity of the internal structure of this folk category. A consideration of the contrast and combination of diagnostic attributes used to distinguish the different types of ***frailejón*** is necessary in order to get a better grasp of the variable perceptual distances among different taxa and to appreciate our claim that this folk category encompasses elements of both life form and generic ranks. Table 1 presents a list of the diagnostic morphological, ecological and utilitarian attributes according to each folk taxon. The inventory of specific morphological attributes found in this table (second column) can be analyzed in terms of thirteen abstract (i.e. widely applicable) attributes or dimensions of oppositional contrast: (i) plant shape (rosette or not), (ii) plant size (large vs. small), (iii) plant stem habit (acaulescent vs. stemmed), (iv) leaf color, (v) leaf length or size (short vs. long, thick vs. thin), (vi) leaf toughness (tough vs. bland), (vii) leaf texture (tomentose vs. pubescent), (viii) flower color, (ix) flower stem (scapose vs. nonscapose), (x) flower texture (hairy vs. smooth), (xi) flower disposition (compound vs. noncompound), (xii) root toughness, and (xiii) root size. Certain attributes are sometimes transparently named in secondary lexemes indicating lower inclusive taxa; for example, color (***f. amarillo, f. plateado, f. morado, f. dorado***, etc.), size (***f. gigante, f. chiquito***, etc.) and texture (***f. motoso, f. tieso***, etc.). Productive secondary lexemes reflecting the cultural context (***f. e'indio, f. cigarrón,*** etc.), as opposed to ecological context, were also recorded. Taxa at the lowest inclusive taxa are usually distinguished by nomenclature referring to the attributes of leaf size and color (e.g. ***f. amarillo grande, f. amarillo fino, f. dorado fino, f. plateado grueso, tutana blanca***). The typical ecological range, mainly referring to different altitudinal levels, of the plant constitutes another important defining feature (see third column) but this is rarely expressed in the nomenclature (to be discussed below). The distribution of morphological attributes within the set of segregates is

TABLE 1. Folk perceptual, ecological and utilitarian diagnostic features involved in the discrimination of the different "classes of ***Frailejón***"

Name (s)	Morphological	Ecological	Utilitarian
frailejón, f. común, f. de embojotar queso, f. chiquito	grows attached to the ground, long firm whitish-grayish cottony basal leaves in rose-like arrangements, intense yellow compound flowers.	grows in groups throughout the entire paramo range**	*Leaves*:: wrapping material for cheese, butter or eggs; bedding for domestic animals; mattress stuffing; patching of holes in house walls; sponges, for cleaning household artifacts and for personal bathing; toilet paper; feminine sanitary napkins; animal food; human food. *Underground stem (tureca)*: fire burning fuel. *Scape and flowers* : ornamental, in christmas nativity scenes, mortuary arcs, and spiritual altars. *Roots* : medicinal. *Seedlings* : medicinal, good for healing nasal and bronchial infections (***destiladeros***) and neck pains (***hoyas***).
frailejón de fabrica fina	whitish-grayish cottony leaves in rose-like arrange-ment, hairy stem.	relatively flat open spots, in proper paramo***	*Scape and flowers*:: ornamental.
frailejón amarillo	long yellow cottony leaves, branched flower stem.	grows in patches near lakes, in *páramo bajero* ('lower paramo')****	*Leaves*:: bedding of domestic animals; mattress stuffing; sponges, for cleaning household artifacts and for personal bathing; toilet paper. *Dry underground stem* : fire burning fuel. *Scape and flowers* : ornamental.
frailejón amarillo fino	grows attached to the ground, yellowish slightly hairy leaves in rose-like arrangement, compound flowers.	proper paramo***	*Underground stem* : fire burning fuel. *Roots* : medicinal.
frailejón amarillo grande	long broad yellow cottony leaves, orange-reddish compound flowers.	grows in the highest/ coldest areas of the paramo*	*Stem* : fire burning fuel. *Leaves* : domestic animal bedding. *Whole plant* : ornamental.
frailejón amarillo grueso	stemless, grows attached to the ground, broad tough yellow hairy leaves in rose-like arrangement.	grows in groups near rocks, highest/coldest areas of the paramo*	*Leaves*:: domestic animal bedding; mattress stuffing; patching of holes in house walls; sponges, for personal bathing; feminine sanitary napkins; toilet paper.
frailejón dorado	long broad yellow cottony lleaves, orange compound flowers.	grows in the highest/ coldest areas of the paramo*	*Roots* : medicinal. *Leaves* : ornamental.
frailejón dorado fino	long smooth greenish-whitish leaves in rose-like arrangement, short thin stem.	proper paramo***	*Roots* : medicinal. *Stem* : fire burning fuel. *Leaves* : domestic animal bedding.
frailejón e'indio	long firm silver-green cottony leaves in rose-like arrange-ment, short thin stem.	gcreek deltas and dried lake beds, in proper paramo***	*Scape and flowers*:: ornamental. *Roots and leaves* and *Stem resin* : medicinal. *Leaves* : sponges, for cleaning household items and personal bathing; animal food; human food.

TABLE 1. Continued

Name (s)	Morphological	Ecological	Utilitarian
frailejón gigante	large single stem hairy plant, gray-white leaves in rose-like arrangement.	proper paramo***	*Leaves*:: sponges, for cleaning household items and for personal bathing (of children); toilet paper. *Stem resin* : combustible fuel.
frailejón platea'o	firm silver hairy leaves in rose-like arrangement, thick soft compound flower with long stem.	humid areas in proper paramo***	*Roots* : medicinal, infusion for alleviating asthma attacks, cough and bronchial infections. *Resin* : fire burning fuel. *Scape and flowers*: ornamental.
chirique	grows close to ground level, silverish slightly hairly leaves in rose-like arrangement.	wet-rocky areas in proper paramo and higher*****	*Whole plant*:: ornamental.
frailejón platea'o fabrica gruesa	grows close to ground level, long silver hairy leaves, long branched flower-stem.	proper paramo***	*Scape and flowers*:: ornamental. *Roots* : medicinal.
frailejón platea'o fino	single short and thick stem, long silver hairy leaves in rose-like arrangement, branched flower-stem.	*páramo calentano* ('warmer páramo')******	*Scape and flowers*:: ornamental. *Roots* : medicinal.
frailejón tieso, f. verde	small plant, grows close to ground level, small and thin greenish leaves, large thick roots.	wet-rocky areas in proper paramo and higher*****	*Roots* : medicinal. *Seedlings* : medicinal, good for healing nasal and bronchial infections and neck pains. *Whole plant*: animal food.
frailejón casco e'burro/ tauco	small plant, grows close to ground level, long green leaves, large thick tough roots.	wet-rocky areas in proper paramo and higher*****	*Roots* : medicinal, mixed with ***F. morado*** for curing bronchial infections.
frailejón lanoso	single hairy stem, soft or bland cottony leaves in rose-like arrangement.	lower paramo and proper paramo*****	*Leaves*:: sponge for personal bathing; toilet paper; feminine sanitary napkins. *Leaves and roots* : medicinal, prepared as a tea and drunk for relieving chest pain.
frailejón de fabrica lanuda	white-green hairy stem, hairy leaves attached to stem, white hairy compound flowers.	*montaña* ('closed canopy forest') and proper paramo*******	*Leaves*:: domestic animal bedding; mattress stuffing; patching of holes in house walls; sponges for personal bathing; toilet paper.

TABLE 1. Continued

Name (s)	Morphological	Ecological	Utilitarian
frailejón largo	broad whitish hairy leaves, lots of yellowish compound flowers.	mainly lower paramo and less so in proper paramo***	No uses reported.
frailejón de algodón	cottony small plant, short hairy stem, lots of white-green leaves.	entire paramo range**	*Leaves*:: domestic animal beddijng; mattress stuffing; patching of holes in house walls; *Scape and flowers* : ornamental.
frailejoncito	grows close to ground level but with very short hairy stem, lots of white-green cottony leaves, creamy-yellowish compound flowers.	entire paramo range**	No uses reported.
frailejoncito pequeño	small cottony plant, long grayish leaves.	grows near rocks in the highest/coldest areas of the paramo*	*Whole plant*:: ornamental.
frailejoncito mot'uo	small cottony plant, bland off-white hairy leaves.	proper paramo***	*Whole plant*:: ornamental. *Leaves* : domestic animal bedding.
frailejoncito motoso	small cottony plant, grows in a chain-like arrangement and forms mattress-like patches, whitish hairy leaves, yellowish-white flowers.	grows in humid soils in the proper paramo***	*Roots* : medicinal, for cough and chest pain. *Whole plant*:: medicinal, prepared as beverage and taken for menstrual ailments and varicose veins.
frailejón morado/ mora'o	tiny plant, grows very close to ground level, green hairy leaves, white-violet compound flower.	wet and shady spots, near lakes and swampy lands, in the proper paramo**	*Roots, leaves and flowers* : medicinal, prepared as a beverage and taken for digestive and circulatory disorders; commercial-medicinal, famous asthma remedy.
frailejón cigarrón	grows close to ground level but with short somewhat hairy stem, green hairy leaves in rose-like arrangement, violet compound flower.	grows among rocks in the highest/coldest areas of the paramo*	*Whole plant*:: medicinal; animal food.
frailejonote	small tree, tough broad slightly hairy leaves, white hairy flowers.	grows in monospecific stands or forest patches of few species in the proper paramo***	*Stem* : construction, house or fence pole; technological, shaft of agricultural tools. *Woody parts* : fire burning fuel. *Leaves*:: sponge, for cleaning tools.

TABLE 1. Continued

Name (s)	Morphological	Ecological	Utilitarian
frailejón de arbolito	small tree but taller than *frailejonote*, tough oblong hairy leaves, whitish flowers.	grows in groups in the closed canopy forest or lower paramo********	*Stem* : construction, house or fence pole; technological, shaft of agricultural tools. Woody parts : fire burning fuel.
arrastrada	stemless plant, grows close to ground level, yellowish-whitish hairy leaves in rose-like arrangement, cream colored compound flowers.	grows in the highest/ coldest areas of the paramo*	*Scape and flowers*: ornamental. *Whole plant*:: animal food.
tutana	small cottony plant, grows in a chain-like arrangement, whitish hairy leaves, hairy stem.	proper paramo***	*Whole plant*:: animal food, eaten by cattle. *Leaves* : domestic animal bedding; construction, patching for house walls
tutana blanca	cottony plant, grows in a chain-like arrangement, whitish hairy leaves, white-yellowish flowers.	proper paramo***	*Leaves*:: domestic animal bedding; construction, patching for house walls.
viravira	slightly hairy stem, cream-white hairy and cottony leaves, cream- white compound flowers	proper paramo***	*Roots and leaves* : medicinal, prepared as a beverage and as a poultice (applied to feet), for curing influenza, fever, hypertension, and body aches. *Leaves*:: domestic animal bedding.
viravira macho	tough slightly hairy stem, cream-white hairy leaves, hairy compound flowers	grows in groups in the lower paramo****	Counterindicative as fire burning fuel or as domestic animal bedding.
viravirón	tough hairy stem, cream-white hairy leaves, hairy compound flowers.	proper paramo***	*Leaves*:: domestic animal bedding, especially rabbits. *Leaves and flowers* : medicinal, prepared as a beverage along with the flowers of *F. común* and drunk as a cough supressant.
familia del frailejón	small cottony plant, white hairy leaves, yellow flowers.	grows in groups in the lower paramo****	No uses reported.
sin nombre	hairy herb, oblong hairy leaves, yellow flowers.	grows in groups in the lower paramo****	*Whole plant*:: ornamental; animal food, eaten by cattle.

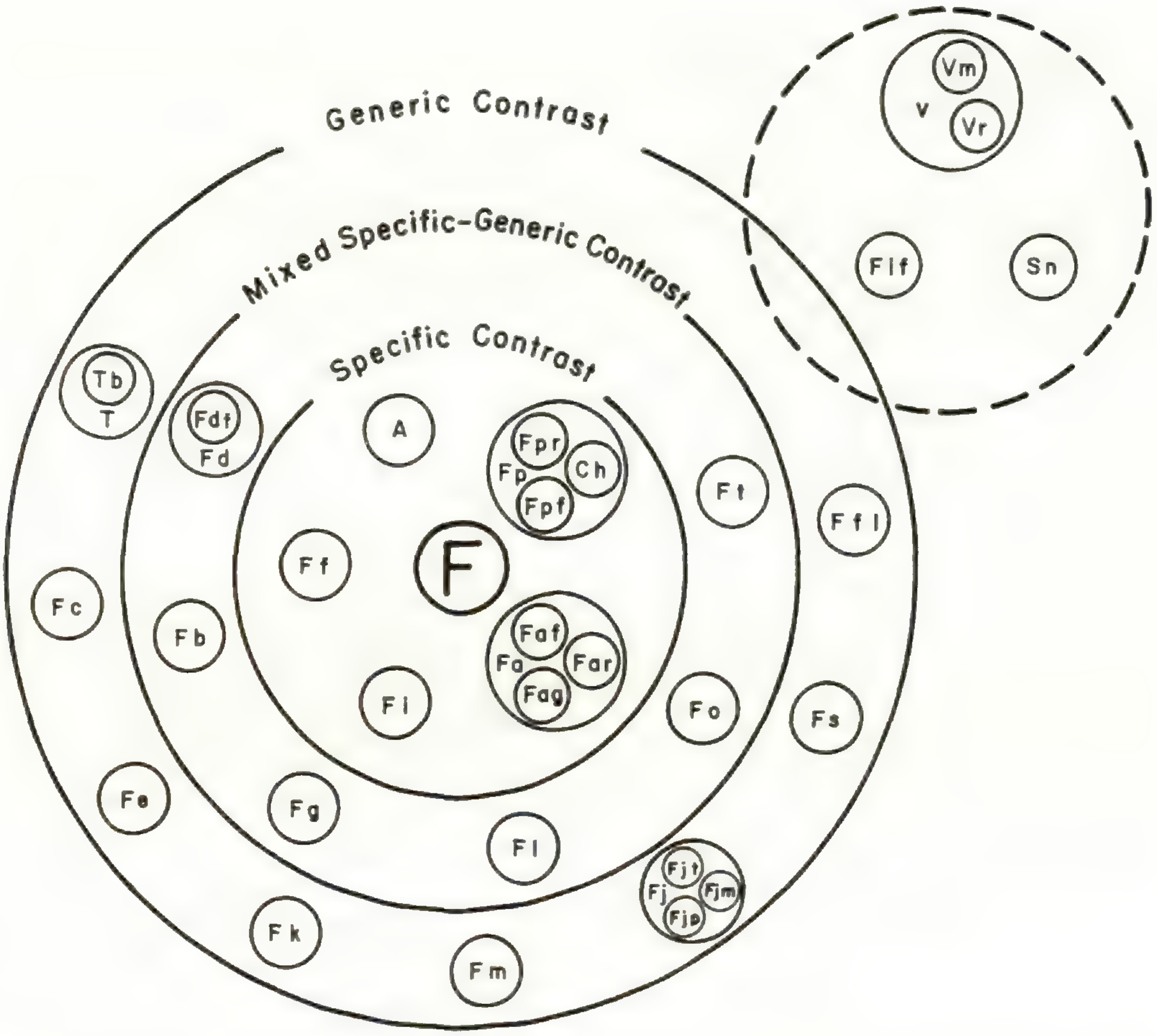
* over 3800-4000 masl aprox.
** from 2500 to 4700 masl aprox.
*** between 3200-4000 masl aprox.
**** between 3000-3500 masl aprox.
***** between 3000-4500 masl aprox.
****** between 2000-3000 masl aprox.
******* between 1500-3500 masl aprox.
******** between 1900-3000 masl apro

FIGURE 4.– Nonflowering Individual of the ***Frailejón común*** *(Espeletia schultzii).*

not entirely even or random. Notice that several specific attributes are more widely distributed among numerous members of the group, namely: rosette shapes, acaulescence, pubescent leaves, white-silver-green colored leaves, and scapose flowers. These are in effect the dominant morphological attributes that define the entire grouping, and indeed their clustered yet variable distribution throughout the class point to the existence of a prototypical gradient. The ***frailejón (común)*** is characterized as an acaulescent rosette, with long (5-100 cm) whitish-grayish firm pubescent basal leaves, yellow scapose compound flower, and grows up to approximately one meter high (see Figure 4). Thus the morphological makeup of the focal taxon largely coincides with the attributes that are found to be dominant throughout the entire class.

The varying significance of the abstract attributes among different taxa within the group, the existence of a class prototype, and the implied class membership gradient point us toward the generic-like (i.e. configurational set) aspects of this life form-like category. However, the perceptual complexity and indeed ambiguity of this category, whether generic or life form, became apparent to us during interviews in which we asked our Paramero collaborators to name the defining features of the ***frailejón*** group in general and the prototypic ***frailejón*** in particular. On one hand, a number of them were simply unable to abstract single morphological features and suggested that the most appropriate way to know the plant is simply to look at it, thus implying that they apprehend the group as a gestalt-like totality. On the other hand, a minority of people did point out some abstract attributes, such as plant shape, referring particularly to the rosette arrangement (***"una mata redonda que se abre desde el centro"*** 'a round plant that opens from the center'), the pubescent leaf (***lanosa*** 'wooly', ***algodonosa*** 'cotton-like', ***cobijosa*** 'blanket-like'), and/or the scapose flower (***flores altas*** 'tall flowers'). Such expressions seem to provide us with a divisional (i.e. positive and opposed) type of contrast with the other so-called life forms.

An examination of the variable distribution of attributes among the different types of ***frailejón*** permits us to chart the pattern of graded membership (i.e. perceptual distance from the prototype) within this grouping. Gradations may be observed in terms of particular attributes: stem habit (or height), for example, ranges from acaulescent (***pega'o al suelo***, 'attached to the ground') (e.g. ***f. común*** *E. Schultzii*; ***f. dorado*** *E. aurantia*; ***f. mora'o*** *O. venezuelense, O. limnophilum*; ***f. motoso*** *L. Longifolia*; ***f. motu'o*** *G. Antennarioides*) to monocaule (e.g. ***f. largo*** *G. moritzianum*; ***f. gigante*** *E. alba*; ***f. platea'o*** *E. Floccosa*; ***f. e'indio*** *E.* cf. *lindenii*) to tree-like (up to 3 meters tall) (e.g. ***frailejónote*** *P. venezuelae*; ***f. de arbolito*** *E. neriifolia*). But, due to the multiple overlapping of certain attributes, the distance of a taxon from the prototype can also be interpreted as a function of the number of attributes that it does not share with the prototype, as depicted in figure 5. Those taxa (***tutana***, ***f. largo***, ***frailejónote***, ***f. fabrica lanuda***, ***f. morado***, ***f. de arbolito***, ***frailejóncito***, and ***f. cigarrón***) shown within the outer ring of the concentric circle drawing, labeled as "generic contrast", differ from the focal ***frailejón*** (***común***) by five or more specific attributes. We consider that this number of differences adds up to a configurational gap of gestalt-like proportions, instantaneously appreciated from its general aspect, and thus similar if not equal to the contrast between distinct folk generics. Those taxa (***f. dorado***, ***f. tieso***, ***f. gigante***, ***f. lanoso***, ***f. de algodon*** and ***f. casco e'burro***) depicted



Key :

A	– Arrastrada	Fd	– F. dorado	Fj	– Frailejoncito
F	– Frailejón (Común)	Fdf	– F. dorado fino	Fjp	– Frailejoncito pequeño
Ff	– F. de fabrica fina	Fg	– F. gigante	Fjm	– Frailejoncito motu'o
Fa	– F. amarillo	Ft	– F. tieso	Fjt	– Frailejoncito motoso
Faf	– F. amarillo fino	Fb	– F. casco e'burro	Fk	– Frailejonote
Fag	– F. amarillo grande	Fl	– F. lanoso	T	– Tutana
Far	– F. amarillo grueso	Fo	– F. de algodon	Tb	– Tutana blanca
Fp	– F. platea'o	Ffl	– F. fabrica lanuda	V	– Viravira
Fpr	– F. platea'o fabrica gruesa	Fe	– F. largo	Vm	– Viravira macho
Fpf	– F. platea'o fino	Fm	– F. morado	Vr	– Viravirón
Ch	– Chirique	Fc	– F. cigarrón	Sn	– Sin nombre
Fi	– F. e'indio	Fs	– F. de arbolito	Flf	– Familia del frailejón

FIGURE 5.– Relative Perceptual Map of the *Frailejón* Higher Inclusive Category.

in the middle ring, labeled as "mixed specific-generic contrast", differ from the focal taxon by three or four specific attributes. This level of difference is perhaps more than what we would expect to find between folk specifics (cf. Berlin 1992:102-108), but we would still hesitate to postulate an instantly recognizable configurational or total image (i.e. generic) contrast. Rather, it appears to be somewhere in between. Those taxa (***arrastrada, f. fabrica fina, f. e'indio, f. amarillo,*** and ***f. platea´o***) included in the inner ring, labeled "specific contrast", differ from

the class prototype by no more than one or two specific attributes, noticed by detailed inspection, and therefore correspond to the expected difference between folk specifics. Within some of the small circles, we have drawn even smaller circles to indicate inclusive subordinate taxa. Taxa at this level are distinguished nomenclaturally by a tertiary lexeme (e.g. ***f. plateado fino***, ***f. plateado grueso***) that refers to a very specific formal attribute, and thus are similar to what Berlin has called folk varietals. Finally, the taxa belonging to the far extended range of the class (***viravira***, ***familia de frailejón*** and ***sin nombre***) are shown in a smaller partially tangent, slightly overlapping circle.

Ecological Classification.– The strong cognitive association of the ***frailejón*** with the paramo landscape is reflected in the use of ecological attributes to define the higher inclusive class as well as to distinguish among the lower inclusive taxa. By ecological attributes, we mean the habitat of the plant as expressed in terms of altitudinal range, geological features, humidity conditions, or interspecific associations. The ecological parameter may in fact be more important than morphological criteria when it comes to conceptualizing the entire grouping of plants, for the most common answer to our question about what are the defining features of the ***frailejón*** was that it is a plant that grows exclusively in cold environments and uniquely in the paramo. Thus a higher level of consensus could be observed regarding the ecological definition of the ***frailejón*** as opposed to the naming of diagnostic morphological traits.

The ***frailejón*** not only stands out as the most ubiquitous and conspicuous biotype in the paramo, but it is also common to find more than one species inhabiting the same area. The prototypical *Espeletia schultzii* displays the broadest

FIGURE 6.– A Typical Paramo Landscape Dominated by ***Frailejón*** Plants.

distribution (growing between 2,500 and 4,700 m.a.s.l.) and is usually the dominant species throughout its entire range (see Figure 6). Due to its exceedingly common appearance over the landscape, it is sometimes aptly called the ***frailejón común***. No other ***frailejón*** segregates are explicitly named by ecological features, but the ecological range is nonetheless an important attribute recognized and verbalized by many of our Paramero collaborators. Particular types of ***frailejón*** are closely associated with different mountain ecological zones. Six such zones, corresponding to distinct altitudinal ranges, topographic features, and biotic communities, were recorded: ***montaña*** 'closed canopy forest', ***boca e' páramo*** 'paramo-forest ecotone', ***páramo bajero*** 'subparamo, gradual slope', ***páramo calentano*** 'subparamo, steep slope', ***propio páramo*** 'paramo proper', and ***filos más altos/frios*** 'superparamo' (cf. López-Zent 1995). Within the paramo proper, more geographically circumscribed microenvironments are discriminated and expressed through a variety of terms, such as: ***barro/cañada*** 'creek confluence or delta', ***pedregal*** 'rocky patch', ***pantanal*** 'swampy land', ***laguna*** 'lake', ***laguna tapada*** 'dried up lake', ***seco*** 'dry region', ***sabana*** 'relatively flat open spot', and ***bosque*** 'wooded spot'. The ***f. e'indio***, for example, is frequently found growing in humid soils, such as the creek deltas or dried lake beds, and ***f. morado*** typically inhabits swampy lands (see Table 1).

Utilitarian Classification.– The considerable utilitarian significance of the ***frailejón*** plant group should also be considered an important cognitive property that contributes to its overall recognition value, in a collective (i.e. higher inclusive) as well as individual (i.e. lower inclusive) sense. Many of our collaborators verbally identified the higher inclusive category with a notion of general and recurrent utility. A sampling of their statements to this effect include: ***"esa es la mata que***

FIGURE 7.– Parameros collecting ***Frailejón***.

más jusamos nosotros 'that's the plant that we use the most', ***"esa se usa pa' toi'tico, ¡esa si es güena!"*** 'that's used for everything, it really is (a) good (thing)', or ***"a nosotros todo lo más la buscamos diario, no vé que crece en todo la'o aquí en el páramo"*** 'above all else, we look for it on a daily basis. Don't you see that it grows everywhere here in the paramo.' (see Figure 7).

A total of twenty use classes explicitly recognized by the Parameros have been identified (López 1991:364-372), of which twelve describe uses of different ***frailejón***. These include: medicinal, ornamental, firewood, animal feed, human food, construction, animal bedding, human bedding, personal hygiene, cleaning agent, fertilizer, and food wrapping. The most widely applicable use class is medicinal, since nearly half of the terminal taxa in the group are recognized for such function. The distilled essence of the roots of ***f. común, f. morado*** or ***f. e'indio*** comprise the most common key ingredients, along with other herbal roots, of the ***jarabe paramero***. This well known elixir, it is believed, is endowed with multiple curative properties, including a cure for the so-called ***jumores***.[4] ***Frailejón. amarillo fino, f. dorado, f. dorado fino, f. platea'o fino***, and ***f. platea'o fabrica gruesa*** may also be used to prepare the ***jarabe paramero***, but are not considered as essential as the previous types. The leaves of ***f. cigarrón*** are soaked in ***miche*** 'cane liquor' and poulticed on the soles of the feet (***plantillas***) in order to alleviate fever, while a tea is prepared using the whole plant and drunk as a remedy for severe headache (***almorranas***). The stem resin of ***f. e'indio*** is boiled and then rubbed onto rheumatic body parts. The roots and leaves of this same plant are imbibed in order to relieve cough and chest pain, and more importantly are considered instrumental in restoring the vital internal organ known as ***cuajo***.[5] The root of ***f. platea'o*** is famous as a cough depressant and is even sold on the market on a small scale.

Numerous nonmedicinal uses of the ***frailejón*** were also mentioned and observed. The tender hearts of ***f. común*** and ***f. e'indio*** are considered edible, and although rarely eaten nowadays were formerly consumed in soups or confections. The leaves of several kinds, most commonly ***f. dorado, f. amarillo*** and ***f. común***, are used in the fabrication of domestic animal shelters (for horses, mules, cattle, poultry, dogs, and cats), in the manufacture of ***tamos*** 'mattresses', or for chinking drafty house walls. Leaves are also used as sponges for cleaning utensils or for personal bathing and hygiene, as feminine sanitary napkins (during the menstrual period), and as handkerchiefs. The prototypical ***frailejón***, sometimes called ***f. de embojotar queso***, is appropriately used 'for wrapping cheese' or eggs. The woody stem of the ***frailejónote*** is hewn in order to manufacture ***horcones*** (structural poles in the houses), fences and ***garrochas*** 'agricultural tools'. The entire inventory of uses according to plant type is described in the fourth column of table 1.

What is the classificatory significance of the multiple use pattern outlined here? It is logical to suppose that the everyday special-use of various types of leaves, stems, roots, and flowers would provide sufficient motive for the Parameros´ ability to discriminate minute similarities and differences among the different species.

CONCLUSION

The Paramero perception and classification of the ***frailejón*** plant group have been reviewed here and it was found that this folk taxon exhibits features charac-

teristic of both life form and generic ranks. In attempting to explain this case of classificatory ambiguity, we began by pointing out that it is highly significant from different cognitive and behavioral points of view: morphological, ecological, and utilitarian. On one hand, the outstanding salience of the higher inclusive category of ***frailejón*** vis-a-vis other such categories is due to the combined effect of the distinct appearance of its members, its conspicuous presence throughout the paramo landscape, and the great number and frequency of uses. On the other hand, discrimination of lesser inclusive taxa within this folk botanical group is also enhanced by the knowledge of particular attributes according to three (instead of just one) semantic dimensions, thus leading to the considerable internal taxonomic variation we have described here.

The taxonomic evidence reviewed here showed that the ***frailejón*** is not grouped under any of the more common (i.e. cross-culturally present) life form categories abstracted by the Parameros. The ***frailejón***, along with the ***díctamo***,[6] are higher inclusive categories unique to Paramero folk botany that appear to be generated by more than purely biomorphological criteria, thus confirming Bulmer's (1979) claim that higher inclusive categories are constructed upon ecological and cultural considerations. The life form status is also suggested by the group's broadly polytypic and biologically divergent composition. From a folk standpoint, at least 20 lower inclusive taxa were identified and a few of these taxa are further differentiated at a lower level. Scientifically, all members of the group belong to the Asteraceae botanical family, but they encompass six genera, three of which are in turn polytypic for a total of seventeen species (and possibly more since determinations of some of the plant material collected are still in progress). Meanwhile, the fuzzy set character of the higher inclusive category is suggested by the discovery of covert categories of plants considered to belong to the "***frailejón*** family" but not designated as full-fledged ***frailejón***.

Categorical complexity is also reflected in the nomenclatural patterns observed here. The term ***frailejón*** is used polysemously to refer to the higher inclusive grouping of all the plants discussed above or to the lower inclusive prototype exclusively. However, the prototype can also be named by the alternative binomial constructions of ***f. chiquito***, ***f. común***, or ***f. de embojotar queso***. Significantly, the modifiers refer to salient morphological (i.e. plant size), ecological (i.e. population frequency), and use (i.e. food packaging) features respectively. Among other taxa at the lower inclusive level, one observes a variety of nomenclatural forms: secondary productive lexemes, primary productive lexemes, and primary unproductive lexemes. At the lowest inclusive level, secondary or tertiary lexeme combinations are found.

Turning to the identification of taxa, we have argued that two cognitive processes are involved here. The higher inclusive concept of ***frailejón*** is apprehended as a total image phenomenon, with the prototypical attribute complex serving as the focal image for the entire group. Within the group, a range of perceptual distance between the prototype and other lower inclusive taxa was observed based on a count of the number of shared attributes. Some taxa differ from the prototype by no more than one or two very specific features, indicating that the perceptual gaps between them are relatively small. Meanwhile other taxa are perceptually more peripheral in that they differ from the prototype in a more integral way, by at least five distinct attributes (pubescence or tomentosity of the leaves; shape of

leaves; acaulescence or monocaulescence, etc.). The degree of contrast among lower level taxa thus ranges from folk specific-sized to generic-sized gaps. The finding of generic-like perceptual contrasts at the lower inclusive level gives further weight to the claim that the higher inclusive category of ***frailejón*** approximates the rank of life form and should not be considered as merely an unaffiliated generic. In other words, the solution of double indexing this taxon at both ranks must be ruled out on empirical grounds. Furthermore, when describing the affinity of more distant taxa to the prototype, Parameros tend to speak of one to a few abstractable attributes such as long whitish hairy leaves, scapose flowers/inflorescences, and acaulescence. This sort of deductive discrimination for purposes of associating perceptually more distant taxa with the prototype implies that a divisional contrast between the higher inclusive grouping and other higher inclusive categories, however latent, is in fact being made. We have also observed that individual morphological attributes of the ***frailejón*** are sometimes abstracted in order to provide a reference mark for describing other plants, such as 'this plant is round or has woolly leaves, like the ***frailejón***'.

The prototypic structure of the higher inclusive ***frailejón*** segregate and the range of variable perceptual contrasts among lower inclusive taxa provide a challenge to Berlin's (1992:31) previous definition of rank as "comparably sized perceptual gaps." In short, we believe that a model of rank based on rigid notions of perceptual discreteness and category boundedness is unable to explain the empirical complexity observed in the ***frailejón*** concept. In our opinion, a continuum concept of rank provides a better fit between model and data in the case studied here. That is because it is more consistent with the concept of graded category membership and more importantly is more capable of accounting for certain higher inclusive biological taxa whose perceptual salience is more natural or integral than others. Regarding the latter point, we concur with Hunn's (1987) observation that some higher inclusive (i.e. life form) categories are as perceptually natural as folk generic categories or somewhere in between, and propose that the ***frailejón*** is one of them. This finding in turn supports the position that perceptual salience is contrived more as an empirical issue rather than a theoretical axiom, and therefore the particular biological, ecological and cultural context is a potentially important influence on the structure and depth of ethnobiological rank observed in different cultural settings.

Accordingly, we offer an empirical ecological explanation of the paradoxical, rank-crossing mode of classifying the ***frailejón*** group. Our explanation focuses on the peculiar evolutionary and biogeographical history of this plant grouping within the paramo biome. Cuatrecasas (1986:274) has written that the original center of the Espeletiinae (Asteraceae, tribe Heliantheae) is found in the Venezuelan Andes, in the Cordillera de Mérida. It is well known that centers of origin of biological genera and species are marked by high diversification of organisms within a relatively compact area. Diversification is attributed to the fact that processes of speciation are assumed to have longer histories (i.e. more time in which to diversify) in these regions. Where the process of diversification is older and more advanced one should also expect to find a greater range of differences among species since some specific distinctions reflect relatively recent separations while others are the result of more ancient separations. Thus some species of ***frailejón***/

Espeletia found in the paramo have diverged relatively recently and are differentiated for systematic purposes on the basis of the number of petioles shown. In fact, a number of the key traits used by biosystematists to identify different species of *Espeletia* involve the florescence or reproductive parts, which often appear for short seasonal periods in the paramos, thus for much of the year the plants do not display flowers or fruits. It just so happens that the Espeletiinae geographic center named by Cuatrecasas corresponds to the local environment where our fieldwork took place. How does the local population respond when the local area they inhabit is a center of biological origin and dispersal marked by high diversification locally of a group of related organisms? In this case we see the smaller differences (recent changes) treated as contrasts at the specific rank and the larger differences (ancient changes) treated as generic distinctions. Meanwhile the overall high biological diversity of this clade within the same local environment stimulates classificatory treatment of the group as a segregate at the life form rank.

Finally, we would like to point out a more general significance of the present case study for the advancement of ethnobiological theory. The study of endemic or distributionally limited plants or animals and of folk classifications systems operating within ecologically unique regions such as centers of biological origin and dispersal or stressful ecosystems may serve to expand and refine the current outlines of ethnobiological theory. For too long, theorists have regarded these kinds of organisms or areas as exceptional and hence theoretically uninformative. We hope to have shown on the contrary that the study of so-called aberrant organisms and spatially restricted ecosystems may provide useful theoretical insights.

NOTES

[1] Certain genera of the Bromeliad (e.g. *Puya*) and Orchid (e.g. *Elleanthus*) families are also treated as unaffiliated generics because they are not included within any higher inclusive taxon.

[2] The last three segregate names mentioned here appear to be of Indian origin, judging from their phonetic characteristics. However, no linguistic studies of the aboriginal languages of this region were made before they ostensibly went extinct nor can it be confirmed (although speculation abounds) that speakers of these languages survived to the present day. Notice that the botanical terms are primary lexemes, as may be expected of folk generics.

[3] The primary lexemes, ***frailejón-cito*** 'small ***frailejón***' and ***frailejón-ote*** 'large ***frailejón***', contrast according to the dimension of size, the lexemic form thus consisting of two morphemes (plant name + size modifier suffix).

[4] ***Jumores*** refers to a Paramero ethnomedical concept, somewhat difficult to apprehend because there is no precise equivalent in modern medical thought. It is tentatively translated here as an infection that affects different body parts or functions, such as the bronchus, circulatory system (e.g. varicose veins), or menstrual cycle. A frequently mentioned symptom of this infection is white urine.

[5] The Parameros believe that the concept of human beingness entails the possession of at least four vital elements: the body, the soul, the ***cuajo***, and the ***paletilla***. The latter two are said to be located in determinate positions within the human body and there they should remain still or only move slightly within well defined restricted spaces. Such areas are delimited differently according to the age, sex, and fertility status of a person. The ***cuajo*** is situated above the abdomen to the right side of the navel and the ***paletilla*** is housed just below the right rib cage in the upper section of the stomach. Maintaining the correct positioning of these organs is considered to be absolutely critical to the continued life and health of human beings. Thus any abrupt or sudden movement of them can endanger the life of a person. The sudden appearance of unexplained disorders or pain, especially abdominal ailments, are interpreted as symptomatic of such movements. In the event of their movement, the Parameros deem that the correct position can be restored only by way of ***sobas*** 'massages' performed with certain plants, and therefore they regard such plants as permitting and extending their lives.

[6] The ***dictamo*** consists of at least nine folk species and is highly polymorphic, perhaps more so than the ***frailejón*** category. Three species of this group have been identified as belonging to three different botanical families (Poaceae, Campanulaceae, and Gentianaceae). The main criteria for class inclusion appear to be cultural (i.e. ideological) and functional: that is, these plants are considered to be invested with chemical-spiritual powers relating to notions of vitality and immortality among the Parameros and thus they are typically employed in the concoction of youth elixers and the like (see López 1991: 310-312, 371-373, 413-414).

ACKNOWLEDGMENTS

We are very grateful for the hospitality and friendship of the Parameros and for their willingness to share their botanical, cultural and ecological knowledge with us. This paper was improved by comments made on earlier versions by Drs. Brent Berlin and Eugene Hunn, and by two anonymous reviewers. However, we also acknowledge that they do not necessarily agree with all of the ideas presented herein. Thanks are also due to Carlos Quintero for drawing the maps and one of the figures.

LITERATURE CITED

ARCHIVO Histórico de la Provincia de Mérida (Registro Principal). 1791, 1803, 1804, 1806, 1807 y 1837. Asuntos diversos. Ventas y pleitos de Derechos de Tierras en el *páramo* de Los Conejos. Tomos XXXV, XLVIII, XLIX, LI, LIII y LXXXI.

ATRAN, S. 1993. Cognitive Foundations of Natural History: Towards an anthropology of science. Cambridge University Press, London.

———. 1987. The essence of folkbiology: A reply to Randall and Hunn. American Anthropologist 89(1):149-151.

———. 1985. The nature of folk-botanical life-forms. American Anthropologist 87(2):298-315.

ATRAN, S. ESTIN, P., COLEY, J. & MEDIN, D. 1997. Generic species and basic levels: Essence and appearance in folk biology. Journal of Ethnobiology 17(1):17-43.

AZOCAR, A. 1980. Los páramos de Venezuela. Pp. 16-21 *in* Páramos Venezolanos, Weidmann, K. (editor). Librería Alemana/Fundación Polar, Caracas.

BALSLEV, H. and LUTEYN, J.L. 1992. Introduction. Pp. x-xiv *in* Páramo: An Andean Ecosystem under Human Influence, H. Balslev and J. Luteyn (editors). Academic Press, New York.

BERLIN, B. 1992. Ethnobiological Classification: Principles of Categorization of Plants and Animals in Traditional Societies. Princeton University Press, New Jersey.

———. 1978. Ethnobiological Classification. Pp. 9-26 *in* Cognition and Categorization, E. Rosh & B. Lloyd (editors). Lawrence Erlbaum Associates, Hillsdale.

———. 1976. The concept of rank in ethnobiological classification: Some evidence from Aguaruna folk botany. American Ethnologist 3(3):381-99.

———. 1974. Further notes on covert categories and folk taxonomies: A reply to Brown. American Anthropologist 76:327-329.

———. 1973. Folk systematics in relation to biological classification and nomenclature. Annual Review of Ecology and Systematics 4:259-71.

———. 1972. Speculations on the growth of ethnobotanical nomenclature. Journal of Language and Society I:51-86.

BERLIN, B., D. BREEDLOVE, and P. RAVEN. 1974. Principles of Tzeltal Plant Classification. Academic Press, New York.

BERLIN, B., BREEDLOVE, D., & RAVEN, P. 1973. General principles of classification and nomenclature in folk biology. American Anthropologist 75(1):214-42.

BILLINGS, W.D. 1974. Artic and alpine vegetation: Plant adaptations to cold summer climates. Pp. 403-43 *in* Artic and Alpine Environments, J. Ives & Barry (editors). Methuen, Great Britain.

BROWN, C. 1987. The folk subgenus: A new ethnobiological rank. Journal of Ethnobiology 7(2):181-192.

———. 1984. Language and Living things. Rutgers University Press, New Jersey.

———. 1979. Folk zoological life-forms: Their universality and growth. American Anthropologist 81(4):791-817.

———. 1977. Folk biological life forms: Their universality and growth. American Anthropologist 79:317-342.

BUDOWSKI, G. 1968. La influencia humana en la vegetación natural de montañas tropicales americanas. Pp. 157-62 *in* Geo-Ecology of the Mountainous regions of the Tropical Americas, C. Troll (editor). Proceedings of the UNESCO, México.

BULMER, R. 1979. Mystical and mundane in Kalam classification of birds. Pp. 57-79 *in* Classification in their Social Context, R. Ellen and R. Reason (editors). Academic Press, London.

———. 1974. Folk biology in the New Guinea highlands. Social Science Information 13(4/5):9-28.

———. 1970. Which came first, the chicken or the egg-head? Pp. 1069-91 *in* Echanges et communications, J. Povillon and P. Maranda (editors). Mouton, The Hague.

———. 1967. Why is the cassowary not a bird? A problem of zoological taxonomy among the Karam of the New Guinea Highlands. Man 2(1):5-25.

CLEEF, A.M. 1983. Fitogeografía y composición de la flora vascular de los páramos de la Cordillera Oriental, Colombia: Una comparación con otras montañas tropicales. Revista Académica Colombiana de Ciencias Exactas 15(58):23-31.

———. 1978. Characteristics of neotropical páramo vegetation and its subantartic relations. Pp. 365-90 *in* Geoecological Relations between the Southern Temperate Zone and the Tropical Mountains, C. Troll and W. Lauer (editors). Edwiss. Forschung 11, franz Steiner Verlag, Wiesbaden.

CUATRECASAS, J. 1986. Speciation and Radiation of the Espeletiinae in the Andes. Pp. 267-303 *in* High Altitude Tropical Biogeography, F. Vuilleumier and M. Monasterios (editors). Oxford University Press and American Museum of Natural History, New York.

———. 1979. Comparación fitogeográfica de páramos entre varias cordilleras. Pp. 89-99 *in* El Medio Ambiente Páramo, M. L. Salgado-Labouriau (editor). CEA / IVIC, Caracas.

———. 1976. A new subtribe in the Heliantheae (Compositae): Espeletiinae. Phytologia 35(1):43-61.

———. 1968. Páramo vegetation and its life forms. Pp. 163-186 *in* Geo-Ecology of the Mountainous regions of the Tropical Americas, C. Troll (editor). Proceedings of the UNESCO, México.

———. 1954. Distribution of the genus *Espeletia*. Rapports Comm. 8 Congress International of Botany. Sect. IV: 131-132.

———. 1934. Observaciones geobotánicas en Colombia. Trabajos del Museo Nacional de Ciencias Naturales, Serie Botánica, 27:1-44.

ELLEN, R.F. 1975. Variable constructs in Nuaulu zoological classification. Social Science Information 14(3/4):201-28.

GAL, S. 1973. Inter-informant variability in an ethnozoological taxonomy. Anthropological Linguistics 15(4):203-219.

GLICK, L.B. 1964. Categories and relations in Gimi natural science. American Anthropologist 66:273-280.

GUHL, E. 1982. Los Páramos Circundantes de la Sabana de Bogotá. Jardín Botánico J.C. Mutis, Bogotá.

———. 1968. Los Páramos Circundantes de la Sabana de Bogotá. Pp. 195-212 *in* Geo-Ecology of the Mountainous regions of the Tropical Americas, C. Troll (editor). Proceedings of the UNESCO, México.

HELDBERG, O. 1992. Afroalpine vegetation compared to paramo: Convergent adaptations and divergent differentiation. Pp. x-xiv *in* Paramo: An Andean Ecosystem under Human Influence, H. Balslev and J. Luteyn (editors). Academic Press, New York.

HUNN, E. 1987. Science and common sense: A reply to Atran. American Anthropologist 89(1):146-149.

———. 1982. The utilitarian factor in folk biological classification. American Anthropologist 84(4):830-847.

———. 1977. Tzeltal Folk Zoology: The classification of discontinuities in Nature. Academic Press, New York.

———. 1976. Toward a perceptual model of folk biological classification. American Ethnologist 3(3):508-28.

JAHN, A. 1931. Los páramos venezolanos. Boletín de la Sociedad Venezolana de Ciencias Naturales 1(3):93-132.

JAMES, D. 1975. The evolution of the Andes. Scientific American 229(2):61-69.

KAY, P. 1975. A model-theoretic approach to folk taxonomy. Social Sciences Information 14:151-166.

KEMPTON, W. 1978. Category grading and taxonomic relations: a mug is a sort of cup. American Ethnologist 5(1):44-65.

LÆGAARD, S. 1992. Influence of fire in the grass páramo vegetation of Ecuador. Pp. 156-170 *in* Paramo: An Andean Ecosystem under Human Influence, H. Balslev and J. Luteyn (editors). Academic Press, New York.

LAUER, W. 1979. La posición de los páramos en la estructura del paisaje de los Andes tropicales. Pp. 29-45 *in* El Medio Ambiente Páramo, M.L. Salgado-Labouriau (editor). CEA/IVIC, Caracas.

LOPEZ, E. 1993. Páramo: Diferentes visiones. Pp. 109-121 *in* El Cuaternario de la Cordillera de Mérida. Andes Venezolanos, C. Schubert and L. Vivas (editors). Universidad de Los Andes, Mérida.

———. 1992. Notas etnográficas de los Parameros Venezolanos. Boletín Antropológico 24:59-82.

———. 1991. Etnobotánica de los Páramos Venezolanos. Tesis de Grado. (Ms Scientiarun en Biología, mención Antropología), Instituto Venezolano de Investigaciones Científicas, Altos de Pipe.

LOPEZ-ZENT, E. 1995. Percepciones locales del ecosistema páramo: Un análisis de atributos criteriales y variación del informante. Special Issue Scientia Guianæ: Naturaleza y Ecología Humana en el Neotrópico. (5): 238-268.

LUTEYN, J.L. 1992. Paramos: Why study them? Pp. 1-14 *in* Paramo: An Andean Ecosystem under Human Influence, H. Balslev and J. Luteyn (editors). Academic Press, New York.

LUTEYN, J.L., A.M. CLEEF, and O. RANGEL. 1992. Plant diversity in paramo: Towards a checklist of paramo plants and a generic flora. Pp. 71-90 *in* Paramo: An Andean Ecosystem under Human Influence, H. Balslev and J. Luteyn (editors). Academic Press, New York.

MANI, M. 1980. Introduction; The vegetation of Highlands. Pp. 1-10; 127-139 *in* Ecology of Highlands, M. Mani and L.E. Giddings. W. Junk, Boston.

MAYR, E. 1982. The Growth of Biological Thought: diversity, evolution, and inheritance. Belknap Press, Cambridge.

MONASTERIO, M. 1980. Las formaciones vegetales de los páramos de Venezuela. Pp. 93-158 *in* Estudios Ecológicos en los Páramos Andinos, M. Monasterio (editor). Ediciones de la ULA, Mérida.

_____. 1979. El páramo desértico en el Altiandino de Venezuela. Pp. 117-146 *in* El Medio Ambiente Páramo, M.L. Salgado-Labouriau (editor). IVIC/CEA, Caracas.

MONASTERIO, M. and F. VUILLEUMIER. 1986. Preface and Introduction. *In* High Altitude Tropical Biogeography, F. Vuilleumier and M. Monasterio (editors). Oxford University Press and The American Museum of Natural History, New York.

PIFANO, F. 1961. Investigación y docencia en medicina tropical. Archivos venezolanos de Medicina Tropical y Parasitología. Facultad de Medicina, UCV. IV(1):1-199.

PITTIER, H. 1929 (1970). Plantas Usuales de Venezuela. Fundación Eugenio Mendoza, Caracas.

RAMSAY, P.M. and E.R.B. OXLEY. 1996. Fire temperatures and postfire plant community dynamics in Ecuadorian grass paramo. Vegetatio 124:129-144.

RANDALL, R. 1987. The nature of highly inclusive folk-botanical categories. American Anthropologist 89(1):143-146.

_____. 1976. How tall is a taxonomic tree? Some evidence of dwarfism. American Ethnologist 3(3):543-55.

RANDALL, R. & E. HUNN. 1984. Do life-forms evolve or do uses for life? Some doubts about Brown's universal hypothesis. American Ethnologist 11(2):329-349.

RINALDI, M. 1993. Paleoecología cuartenaria. Pp. 199-222 *in* El Cuaternario de la Cordillera de Mérida. Andes Venezolanos, C. Schubert and L. Vivas (editors). Universidad de Los Andes, Mérida.

RIVERA, S. 1992. Neusa 9.000 años de presencia humana en el páramo. Banco de la República, Bogotá.

ROBINSON, H. 1981. A Revision of the Tribal and Subtribal Limits of the Heliantheae (Asteraceae). Smithsonian Contribution to Botany, Number 51, Washington.

RODRIGUEZ XUAREZ, J. 1558. Repartimientos de 1558. Archivo del Registro Principal de Mérida.

RUSE, M. 1992. Biological species: Natural kinds, individuals or what. *In* The Units of Evolution: Essays on the Nature of Species, Ereshefsky (editor). MIT Press, Cambridge.

SALGADO-LABOURIAU, M.L. 1986. Late quaternary paleoecology of Venezuelan high mountains. Pp. 202-17 *in* High Altitude Tropical Biogeography, F. Vuilleumier and M. Monasterios (editors). Oxford University Press and American Museum of Natural History, New York.

SCHUBERT, C. 1980. Contribución de Venezuela al inventario mundial de glaciares. Boletín de Ciencias Naturales 34(137):267-79.

SCHUBERT, C. and L. VIVAS. 1993. El Cuaternario de la Cordillera de Mérida. Andes Venezolanos. Universidad de Los Andes, Mérida.

SIEVERS, W. 1888. Die Cordillere von Mérida. Geographische Abhandlungen. Yale University Library. (1893; presented by Prof. E.S. Dana).

SIMON, Fray Pedro. 1627 (1963). Noticias Historiales de Venezuela. Biblioteca de la Academia Nacional de la Historia, Fuentes para la Historia Colonial de Venezuela, Tomos 66-67.

SMITH, A. 1981. Growth and Population Dynamics of Espeletia (Compositae) in the Venezuelan Andes. Smithsonian Contributions to Botany, Number 48, Washington.

STURM, H. and O. RANGEL. 1985. Ecología de los Páramos Andinos: Una visión preliminar integrada. Museo de Hiatoria Natural, Biblioteca José Gerónimo Triana, Number 9. Instituto de Ciencias Naturales, Bogotá..

TAMAYO, F. 1958. Notas explicativas del ensayo de mapa fitogeográfico de Venezuela. Revista Forestal de Venezuela 1(1):7-32.

TROLL, C. 1968. The cordilleras of the tropical Americas: Aspects of climatic, phytogeographical and agrarian ecology. Pp. 15-56 *in* Geo-Ecology of the Mountainous regions of the Tropical Americas, C. Troll (editor). Proceedings of the UNESCO, México.

VAN DER HAMMEN, T. 1979. Historia y tolerancia de Ecosistemas parameros. Pp. 55-78 *in* El Medio Ambiente Páramo, M.L. Salgado-Labouriau (editor). CEA/IVIC, Caracas.

VAN DER HAMMEN, T. and A. CLEEF. 1986. Development of the high Andean paramo flora and vegetation. Pp. 153-201 *in* High Altitude Tropical Biogeography, F. Vuilleumier and M. Monasterio (editors). Oxford University Press and American Museum of Natural History, New York.

VARESCHI, V. 1970. Flora de los Páramos. Ediciones del Rectorado. ULA, Mérida.

VERWEIJ, P.A. and H. BEUKEMA. 1992. Aspects of human influence on upper Andean forest line vegetation. Pp. 171-75 *in* Paramo: An Andean Ecosystem under Human Influence, H. Balslev and J. Luteyn (editors). Academic Press, New York.

VUILLEUMIER, F. 1979. Comparación y evolución de las comunidades de aves de páramo y puna. Pp. 181-206 *in* El Medio Ambiente Páramo, M.L. Salgado-Labouriau (editor). CEA/IVIC, Caracas.

VUILLEUMIER, F. and D. EWERT. 1978. The distribution of birds in Venezuelan páramos. Bulletin of the American Museum of Natural History 162:49-90.

WAGNER, E. 1973. The Mucuchíes phase: An extension of the Andean cultural pattern into western Venezuela. American Anthropologist 75(1):195-213.

———. 1967. The Prehistory and Ethnohistory of the Carache Area in Western Venezuela. Yale University Publications in Anthropology, New Haven.

WIERZBICKA, A. 1985. Lexicography and Conceptual Analysis. Karoma Publishers, Ann Arbor.

The Political Ecology of Bananas: Contract Farming, Peasants, and Agrarian Change in the Eastern Caribbean. Lawrence S. Grossman. University of North Carolina Press, Chapel Hill and London. 1998. Pp. 268. $19.95 (paper) $49.95 (hardcover) ISBN 0-8078-4718-6.

Bananas seem such a simple fruit, but their route to the local market has always been a complicated one, bound up in political and economic imbalances whose roots reach back to the colonial era. In *The Political Ecology of Bananas*, geographer Lawrence Grossman adds an interesting new chapter to this history, analyzing the recent trend away from vertical monopoly toward contract farming of bananas in the Windward Islands. His book arrives at a time when the geography of the banana industry seems likely to change dramatically, because of a recent World Trade Organization decision that may open the European market to the cheaper bananas of such traditional powers as Dole, Del Monte, and Chiquita, at the expense of farmers in the Windwards.

Grossman's aim is examine how well banana contract farming fits ideas about the rise of contract farming generally in this new era of globalization. In contract farming, a purchaser agrees in advance to buy farmers' output but sets procedures for crop production and often provides technological and economic assistance to ensure crop quality. The guaranteed market and the assistance are a benefit to farmers, and the buyer sheds the risks associated with growing the crop. This arrangement has now become common in tropical export agriculture, particularly for labor-intensive specialty crops grown in small peasant plots. As Grossman explains, contract farming has often been seen as responding to the same forces that drive broader industrial restructuring, and contract farmers have been seen as analogous to factory workers, diverted from producing varied food crops for local consumption to producing a standard export commodity to exacting specifications and with high inputs of pesticides and fertilizers. Grossman's thesis is that this view is oversimplified and misleading, and he demonstrates it via a detailed case study of the banana industry of St. Vincent.

The first four chapters of the book provide a progressively detailed introduction: the history and organization of the Leeward Islands banana industry, the rise of banana contract farming, the agricultural history of St. Vincent, and finally the agricultural life of a small village, Restin Hill, where Grossman has carried out detailed studies of the local response to contract farming. Thereafter, the author applies insights from each of these scales to three themes in the literature of contract farming, termed the "labor question," the "food question," and the "environmental question." Grossman points out that farmers in general are not industrial automatons but rather skilled workers who have always had to master a variety of tasks to produce their crops, and that banana farmers in particular have had to adopt increasingly complex technological "improvements" designed to produce the perfect fruit expected on European tables. The inventive ways in which individual farmers adapt to these new requirements show well how they maintain a degree of autonomy despite the power wielded by the buyer. Grossman shows that banana growing is not necessarily done at the expense of local food production, as commonly supposed. In fact, Vincentians have a tradition of food

importation that goes back to the salted codfish of colonial days, and that is presently encouraged by the lower prices of imported than local staples. Contract farming is commonly believed to encourage wasteful and dangerous pesticide use, but in Restin Hill villagers recognize some compounds as toxic and take precautions with them, while experimenting in a variety of ways with their application, not always with detrimental effects. In all these themes, Grossman emphasizes that the complexity of the local adaptation to contract farming often defies both intuition and easy generalization.

Grossman's prose is direct and sometimes vivid, particularly in descriptions of village life and the practical hardships of banana growing. I especially enjoyed his brief discourse on the Vincentian diet. All those chicken backs and necks we *don't* eat at Kentucky Fried Chicken are exported to places like St. Vincent, where they make up an astonishing 40% of chicken imports. This book would certainly be a useful supplement to courses in agricultural geography, Latin American regional geography, and courses focusing on the rise of globalization. It could have been improved by shortening and better integrating the chapters in the first half of the book, and by including some background information (for example, about the various banana genotypes and diseases) in appendixes. I also wish he had explored further some of the questions raised. For instance, can the Windward Islands banana industry shift to production of specialty crops (including specialty bananas)? Is there any possibility of establishing grower-owned cooperatives to redress the present power imbalance in banana production? What other environmental impacts besides pesticide contamination might be exacerbated by banana production? How similar is the situation on St. Vincent to that on the other Windward Islands, particularly those outside the British sphere of influence? These questions aside, Grossman's book is a valuable contribution to our understanding of the volatile historical geography of bananas and a useful illustration of the value of detailed local field work for leavening theoretical generalizations.

Timothy S. Brothers
Department of Geography
Indiana University-Purdue University, Indianapolis
Indianapolis, IN 46202

Journal of Ethnobiology 19(2): 179-218 Winter 1999

GITKSAN PLANT CLASSIFICATION AND NOMENCLATURE

LESLIE MAIN JOHNSON
Department of Anthropology, University of Alberta
Edmonton, Alberta, Canada T6G 2H4

ABSTRACT.– The Gitksan of northwestern British Columbia are speakers of an Interior Tsimshianic language. They live in a mountainous, densely forested environment transitional between the Northwest Coast and the Boreal interior plateau. Traditionally the Gitksan pursued a mixed fishing/hunting/ gathering subsistence strategy. The Gitksan have a roughly hierarchical classification of plants. The general domain 'plant kingdom' or 'floral form' is recognized but not overtly labelled. Within this, several broad groupings of the life form sort can be distinguished. Three of these are large groupings composed of a number of named subordinate generics: ***gan*** 'trees,' ***sgan*** 'plants,' and ***maa'y*** 'berry' or 'fruit plants.' 'Plants' include a diverse mixture of forms ranging from small trees to some perennial herbs, and prostrate sub-shrubs. The 'plant' and the 'berry' groups overlap extensively. The remainder are residual taxa which are empty, containing few or no named subtypes, though encompassing morphological and taxonomically diverse forms: ***habasxw*** 'grass' or 'hay,' ***'yens*** 'leaves' or 'herbaceous plants,' ***majagalee*** 'flowers,' ***umhlw*** 'moss,' and ***gayda ts'uuts*** 'fungi.' A mixture of morphologic and utilitarian characters seems to underlie the system of plant classification. The relationship of partonomy to utility and classification is explored. Ninety distinct generics have been documented. Eighty-four represent vascular plants and six represent mosses, fungi and lichens.

Keywords: classification, Gitksan, ethnobotany, Canada, Northwest Coast

RESUMEN.– Los Gitksan hablan una léngua tsimsiana interior. Viven en una region montañosa y de bosques densos. Es una zona de transición entre la costa noroeste y la meseta interior sub-boreale de la Colúmbia Británica. Tradicionalmente, eran pescadores del salmón, cazeros, y recolectores de diversas plantas. Los Gitksan tienen una clasificación de plantas mas o menos jerárquica. El domínio de 'forma floral,' o sea del las plantas, no es marcado. Dentro de ello, vários agrupaciones generales se pueden distinguir. Tres son grupos grandes compuestos de genéricos subordinados numerosos: 'árboles' (***gan***), 'plantas' (***sgan***) y 'bayeros o fruteros' (***maa'y***). 'Plantas' incluyen a una mezcla de formas diversas desde árboles pequeños a hierbas perenias, y arbustos pequeños prostrados. Los grupos de 'plantas' y 'bayas' coinciden en parte. Los demás son grupos resíduos 'vacíos,' de contener solamente de formas desnombradas, o de pocas formas nombradas, aunque contienen plantas de una variedad morfológica y taxonómica. Incluyen: 'gramíneas' o 'heno' (***habasxw***), 'hojas' o 'plantas herbáceas' (***'yens***), 'flores' (***majagalee***), 'musgos' (***umhlw***), y 'hongos' (***gayda ts'uuts***). El sistema de clasificacíon de las plantas parece subyacer en una mezcla de caracteres morfológicas y utilitarias. Se exploran las relaciones entre la partonomía y la utilidad. Noventa genéricos han sido documentado. De ellos, ochenta y cuatro representan plantas vasculares, y seis representan musgos, hongos y líquenes.

RÉSUMÉ.– Les Gitksan du nord ouest de la Colombie britannique appartiennent à un groupe linguistique Tsimshianique de l'intérieur. Ils habitent un environnement montaigneuse, couvert de forêts épaisses, dans la région transitoire entre la côte nord ouest et le plateau boréal de l'intérieur. De tradition, les Gitksan pratiquaient une stratégie de subsistance mixte basée sur la pêche, la chasse, et la cueillette. Les Gitksan utilisent un système de classification végétale plus ou moins hiérarchique. Le domaine universel 'règne végétal' ou 'forme végétale' est reconnu mais des qualifications ne sont pas évidentes. À l'intérieur de ce domaine, on distingue plusieurs grandes divisions du genre forme vivant. Il s'agit, dans trois de ceux-ci, d'embranchements étendus regroupant plusieurs espèces secondaires désignées: ***gan*** 'arbres,' ***sgan*** 'plantes,' et ***maa'y*** 'baies' ou 'plantes fruitières.' Le groupe 'plantes' rassemble tout un éventail de formes, allant de petits arbres jusqu'à certaines herbes vivaces et des sous-arbrisseaux procombants. Les catégories 'plantes' et 'baies' se chevauchent beaucoup. Les autres groupements comprennent des formes résiduelles vides, c'est-à-dire dénouées de, ou ayant que peu de, sous-genres nommés, bien qu'elles renferment des formes morphologiquement et taxonomiquement différentes: ***habasxw*** 'herbes' ou 'foins,' ***'yens*** 'feuilles' ou 'plantes herbacées,' ***majagalee*** 'fleurs,' ***umhlw*** 'mousse,' et ***gayda ts'uuts*** 'mycètes.' Un amalgame de caractères morphologiques et fonctionnels semble servir de base pour le système de classification végétale. Le rapport entre la partonomie et l'utilité d'une plante, et sa classification est étudiée. De parmi les 90 genres distincts documentés, 84 représentent des plantes vasculaires et 6 représentent des mousses, des mycètes, et des lichens.

INTRODUCTION

The Gitksan of northwestern British Columbia are speakers of an Interior Tsimshianic language. They are in contact both with Coast Tsimshian and Nisga'a to the west and northwest, and interior Athapaskan peoples to the east and south north. They live in the drainage of the Skeena River in a mountainous, densely forested environment, transitional between the mild, wet northwest coast and the boreal interior forests. Traditional subsistence was a mixed fishing, hunting and gathering strategy, with summer dispersal and winter aggregation in large, permanent villages. Modern residence is primarily six villages along the central portion of the Skeena River and two of its tributaries, the Kitwanga and Kispiox Rivers (Figure 1) and in adjacent towns and cities. The modern villages are approximately in the same areas as precontact winter villages. In the recent past two villages further north on the Skeena River were also occupied. People of the three western villages speak a slightly different dialect than the three modern eastern villages. People of the two northern villages, now largely absorbed in the eastern villages, had some distinctive features of speech.

The Gitksan are skilled woodworkers. Traditionally they built plank houses and made dugout canoes as well as totem poles and many smaller wooden items. Other traditional plant uses included gathering of numerous types of berries, a few edible root types, a few green vegetable types, and tree inner bark or 'cambium' principally from hemlock and lodgepole pine for food; use of a number of types of roots, barks and other plant parts for medicines; and use of various barks, roots, and herbaceous plants for cordage, basketry, matting, and clothing.

Figure 1.– Map showing locations of Gitksan territory and villages.

The classification system of the Gitksan is similar to other reported ethnobotanical classifications of indigenous groups from northwestern North America (Compton 1993; Gottesfeld 1993; Hunn 1982, Hunn and French 1984; Johnson-Gottesfeld and Hargus 1998; Turner 1974, 1987, 1989; Turner et al. 1990). The presence of berry plants, mosses and mushrooms as major plant groups along with the more widespread woody plant (or tree and shrub) and grerb (or herb and grass) life forms, seem typical of other classification systems found in this region, as does the loose and overlapping major plant groups found in Gitksan classification. Also similar to other northwestern North American classification systems is the presence of non-taxonomic relationships of affiliation (Turner 1989) or coordination (Hunn and French 1984) between classes. These types of relationship are not taxonomic in the strict sense (see discussion in Ellen 1993) in that classes of ostensibly the same level in the classification system are seen as somehow belonging together, or as being related to one another, without their being included in a superordinate grouping, or one being a kind of the other.

METHODS

The data on which this synthesis is based were gathered over a period of thirteen years in a series of unstructured interviews with elders and other knowledgable people regarding healing, medicinal plants and other plant uses, identification and naming of plants, and landscape classification, and several field trips to gather medicinal plants and plant foods. In 1996, I undertook a short series of more directed interviews. From 1985 to 1988, and sporadically in 1992-1995, some interviews were conducted with the assistance of Beverley Anderson, a Gitksan public health nurse, who also conducted interviews on her own and contributed a great deal of information to the project. I recorded information relevant to plant classification from 41 people: 22 men and 19 women. The majority of these were over 50 years old at the time of interviewing.

I elicited information about plant names and uses by a variety of methods. I often elicited plant information by bringing fresh specimens to elders and inquiring what specific plants were called, and what, if any, their uses were. I also used a looseleaf notebook of colour photos of local plants and plant parts such as berries, stems, petioles or rootstocks during interviews. Some data was obtained during field trips with elders about plants present in the immediate environment. Other plant data were volunteered spontaneously. I confirmed the identity of spontaneously described plants by reference to fresh plant material collected to confirm postulated identifications, and to "case" specimens (Bye 1986) of known identity (e.g. a dried plant rhizome carried as a charm) or by freehand sketches and verbal descriptions, later verified by showing a plant or specimen to an elder to confirm the identification. However, some Gitksan plant information may have been missed as I made no comprehensive attempt to elicit names of all botanical species present in Gitksan territory.[1] I also encountered some terms and/or descriptions and uses for which I could not identify the botanical species referent. I conducted interviews in English, or in Gitksan with a bilingual translator, with use of Gitksan plant names and other botanical terms.

I identified vascular plant specimens by reference to Hultén (1968), and Hitchcock and Cronquist (1973), supplemented by various publications by the Royal British Columbia Museum, and other more recent field guides. The Botany Division of the Royal British Columbia Museum assisted with identification of difficult vascular plant specimens. Bryophytes and fungi were identified with the assistance of the staff of the Cryptogamic Herbarium in the Biological Sciences Department of the University of Alberta. Vouchers are on deposit with the herbarium of the Royal British Columbia Museum (V) and the Vascular Plant Herbarium of the University of Alberta (ALTA), and in my personal collection.

CLASSIFICATION

Overview of Gitksan Plant Classification.– The Gitksan have a roughly hierarchical classification of plants (Figure 2). The general domain of "plant kingdom" or "floral form" is unlabelled. Within this, several broad groupings of the life form sort can be distinguished. The classic definition of life form includes plant groupings

TABLE 1.– Gitksan Generics.

Gitksan Generics	English Name	Latin name(s)
amgiikw	western hemlock	*Tsuga heterophylla* (Raf.) Sarg.
giikw	western hemlock	*Tsuga heterophylla*
amhaawak̲	paper birch	*Betula papyrifera* Marsh
haawak̲	paper birch	*Betula papyrifera*
amhat'a'l	western red cedar	*Thuja plicata* Donn ex D.Don
amk̲'ooxst	trembling aspen	*Populus tremuloides* Michx.
amluux	alder	*Alnus incana* (L.) Moench and *A. rubra* Bong.
luux	alder	*Alnus incana* (L.) and *A. rubra*
am'mal (E)/**am'mel** (W)	black cottonwood	*Populus balsamifera* ssp. *trichocarpa* (Torrey & Gray) Brayshaw
amwasaan	lowland willow trees	*Salix* spp.
'waasan (E)/**'waasen** (W)	willow	*Salix* spp.
ax̲	spiny woodfern	*Drypoteris expansa* (K.B.Presl) Fraser-Jenkins and Jermy
hlgandihl ax̲	spiny woodfern plant (stem)	*Drypoteris expansa*
sganax̲	spiny woodfern plant	*Drypoteris expansa*
bax̲bok̲' (E only)	dandelion	*Taraxacum officinale* Weber
belena 'watsx̲ (E)	clubmoss	*Lycopodium clavatum* L., *L. annotinum* L., *L. complanatum* L., *L. dendroideum* Michx.
belena 'wetsx̲ (W)	clubmoss	*Lycopodium clavatum, L. annotinum, L. complanatum, L. dendroideum*
damtx (E)/**demtx** (W)	'inedible fern root'	*Athyrium filix femina* (L.) Roth, *Drypteris filix-mas* (L.) Schott, small *D. expansa*
dilawsa	northern gooseberry	*Ribes oxyacanthoides* L.
diuxw	'birch fungus'	*Inonotus obliquus* (Pers: Fr.) Pilat and *Fomes igniarius* (L. ex Fries) Kickx
eluuts'ook', haluuts'ook'	chokecherry	*Prunus virginiana* L. var *melanocarpa* (Nels.) Sarg.
sgan'eluuts'ook'	chokecherry	*Prunus virginiana* L. var *melanocarpa*
gaanaxws	a 'braided' looking moss or liverwort	[unknown]
gadimis	black huckleberry (black fruited)	*Vaccinium membranaceum* Dougl.
gahldaats	yellow pond lilly	*Nuphar polysepalum* Englm.
gale'e, k̲'ale'e	rose (hips)	*Rosa acicularis* Lindl.
sgank̲'ale'est (W)	rose bush	*Rosa acicularis* Lindl.
gam	saskatoon	*Amelanchier alnifolia* Nutt.
sgangam (E)	saskatoon bush	*Amelanchier alnifolia*
sgangem (W)	saskatoon bush	*Amelanchier alnifolia*
gapk̲'oyp	bunchberry	*Cornus canadensis* L.
sgangapk̲'oyp	bunchberry plant	*Cornus canadensis*
gasx̲	riceroot lily	*Fritillaria camschatcensis* (L.) Ker-Gawl
gayda ts'uuts	fungus, mushroom	basidiomycete and ascomycete fruiting bodies
gesgan	'tree hair'	*Bryoria* spp.

TABLE 1.– Gitksan Generics.

Gitksan Generics	English Name	Latin name(s)
giis/giist	mountain alder	*Alnus crispa* (Ait.) Pursh.
gwilahl gana'w	lungwort, 'frog blankets'	*Lobaria pulmonaria* and *L. oregana*
gwul litxwit	large leaved avens, 'evergreens'	*Geum macrophyllum* Willd.
ha'mook	cow parsnip, 'wild rhubarb'	*Heracleum lanatum* Michx.
haast	fireweed	*Epilobium angustifolium* L.
hagimgasxw	peavine, 'wild sweet peas'	*Lathryus nevadensis* Wats. and *L.ochroleucus* Hook.
hap'iba'a	bracken fern, tall fern	*Pteridium aquilinum* (L.) Kuhn
habasxw	grass, hay	graminoid plants; Poaceae, Cyperaceae, Typhaceae?
habasxum t'ax	cattails, bullrush, sedge?	Large graminoid plants in lakes *Typha latifoilia, Scirpus* spp., *Carex*?
haxwdakw (E)	yew and/or Rocky Mountain juniper	*Taxus brefivolia* Nutt. and/or *Juniperus scopulorum* Sarg.
sganhaxdekw (W)	yew and/or Rocky Mountain juniper	*Taxus brefivolia* and/or *Juniperus scopulorum*
hinak	skunk cabbage	*Lysichiton americanum* Hultén & St. John
hisgahldaatsxw	wild calla or water arum	*Calla palustris* L.
hisha'mookxwit	Northern rein orchid	*Platanthera hyperborea* (L.) Lindl.
hisdemktxwt	licorice root fern	*Polypodium glycyrrhiza* D.C. Eat.
hismaawintxw	horsetails and scouring rushes	*Equisetum arvense* L., *E. variegatum* Schleich., *E. hyemale* L., *E. sylvaticum* L.
hisgamaawin	horsetails and scouring rushes	*Equisetum arvense, E. variegatum*
hissgank'ots	small false solomon's seal	*Smilacina stellata* (L.) Desf. and ?*trifoliata* (L.) Desf.
hissgant'imi'yt	wintergreens and false box	*Chimaphila umbellata* (L.) Bart.; *Pachystima myrsinities* (Pursh.) Raf.
hlguu gan	? timberline mountain hemlock	*Tsuga mertensiana* (Bong.) Carr. ? (stunted high elevation specimens)
hlit'	swamp currant	*Ribes lacustre* (Pers.) Poir.
hoo'oks/hoo'oxs	subalpine fir, 'balsam'	*Abies lasiocarpa* (Hook) Nutt.
hoobixs 'wiigat	Queen's cup or beadlily	*Clintonia uniflora* (Schult.) Kunth.
hu'ums (E)/**wa'umst** (W)	devil's club	*Oplopanax horridum* (Smith) Miq.
ihlee'em ts'ak	red columbine and Indian paintbrush	*Aquilegia formosa* Fisch. and *Castilleja miniata* Dougl.
is	soapberry	*Shepherdia canadensis* (L.) Nutt.
sgan'is	soapberry bush	*Shepherdia canadensis*
isxum sga'nisxw (E)	Sitka valerian; wild mint?	*Valeriana sitchensis* Bong.; *Mentha arvensis* L.?
isxum sk'ooks (W)	Sitka valerian	*Valeriana sitchensis*
k'awts	'carrots'	*Daucus carrota* L.; *Lupinus ?nootkatensis* Donn
k'ooxst	Douglas maple	*Acer glabrum* Torr. var. *Douglasii* (Hook.) Dippel
k'ots	false Solomon's Seal	*Smilacina racemosa* (L.) Desf.
laxsa laxnok	juniper	*Juniperus communis* L. and *J. scopulorum* Sarg.
sgannaxnok	juniper	*Juniperus communis* and *J. scopulorum*

TABLE 1.– Gitksan Generics.

Gitksan Generics	English Name	Latin name(s)
leek	spreading dogbane, 'nylon plant'	*Apocynum androsimaefolium* L.
sganleek	spreading dogbane, 'nylon plant'	*Apocynum androsimaefolium*
ligimtxhl gan	'tree fur', 'black tree moss'	*Bryoria* spp.
loots'	red elderberry	*Sambucus racemosa* L.
maa'ya gaak	black twinberry, 'crowberry'	*Lonicera involucrata* (Rich.) Banks
sganmaa'yagaak	black twinberry bush	*Lonicera involucrata*
maa'ya luulak'	snowberry, 'ghostberry'	*Symphoricarpos albus* (L.) Blake
maa'yhl litsxw	Queen's cup or beadlily	*Clintonia uniflora*
maa'yim hagwilhuxw	strawberry bramble	*Rubus pedatus* J.E. Smith
maa'ytxwhl smax (E)	wild sarsaparilla	*Aralia nudicaulis* L.
maa'ytxwhl smex (W)	wild sarsaparilla	*Aralia nudicaulis*
maawin	meadow horsetail	*Equisetum pratense* Ehrb.
majagalee	'flower'	residual taxon comprising herbaceous plants with conspicuous flowers
maskwa luuluk (E)	puffball	*Lycoperdon* spp. and perhaps others, such as *Bovista pila*
'mesxwa luulak (W)		
maa'y welgan	wild blue currants	*Ribes laxiflorum* Pursh.
maa'ya ganaa'w	'frogberries'	*Rubus pubescens* Raf.
maa'ya smex	Queen's cup or beadlily	*Clintonia uniflora*
mihlxw	'charred', birch fungus	*Inonotus obliquus* and *Fomes igniarius*
miikooxst/miik'ooxs	salmonberry	*Rubus spectabilis* Pursh.
miigan	highbush blueberry	*Vaccinium ovalifolium* Sm.
miigunt	wild strawberry	*Fragaria virginiana* Duchesne
miidoots	wild strawberry	*Fragaria virginiana*
mii'oot	bog cranberry and ? lowbush cranberry	*Oxycoccos microcarpus* Turez. and perphaps *V. vitis-idaea* L.
miits'ook'	chokecherry	*Prunus virginiana* var *melanocarpa*
milkst	Pacific crabapple	*Malus fuscus* (Raf.) Schneid.
sganmilkst	Pacific crabapple tree	*Malus fuscus*
miyahl (E)	lowbush blueberry	*Vaccinium caespitosum* Michx.
miyehl (W)		
naasik'	raspberry	*Rubus idaeus* L.
nisk'o'o	thimbleberry	*Rubus parviflorus* Nutt.
sdetxs	stinging nettle	*Urtica dioca* L.
seeks	spruce	*Picea engelmannii* Parry, *P. glauca* (Moench.) Voss, *P.* x *lutzii*, and *P. mariana* (Mill) Brit., Sterns & Proggna
sgandaxdo'ohl	Labrador tea, 'swamp tea'	*Ledum groenlandicum* Oeder

TABLE 1.– Gitksan Generics.

Gitksan Generics	English Name	Latin name(s)
sgansa'angitl'	mountain ash	*Sorbus sitchensis* Greene and *S. scopulina* Roem.
sgants'ak' (E) **sgantsek'** (W)	beaked hazelnut	*Corylus cornuta* Marsh.
sgants'imwil'oo'o	swamp currant	*Ribes lacustre*
sgantya'ytxw	snowberry	*Symphoricarpos albus*
sgantye'ytxw	fool's huckleberry	*Menziesia ferruginea* Smith
sgansnaw	pincherry	*Prunus pensylvanica* L.
sgansnax̲	black hawthorn, 'thornberry'	*Crataegus douglasii* Lindl.
sgants'iks	Indian or False hellebore	*Veratrum viride* Ait.
malgwasxw (E)	the root of the Indian hellebore	the root of *Veratrum viride*[1]
melgwasxw (W)	the root of the Indian hellebore	the root of *Veratrum viride*
sginist	lodgepole pine	*Pinus contorta* Dougl.
simgan	western red cedar	*Thuja plicata*
simmaa'y	black huckleberry	*Vaccinium membranaceum*
sbikst (W)	highbush cranberry	*Viburnum edule* (Michx.) Raf.
tiim laalax̲'u	Labrador tea, 'swamp tea'	*Ledum groenlandicum*
t'imi'yt	kinnikinnick	*Artostaphylos uva-ursi* (L.) Spreng.
sgant'imi'yt	kinnikinnick plant	*Artostaphylos uva-ursi*
t'ipyeest	stonecrop	*Sedum divergens* Wats.
ts'anksa gaak̲	nodding onion	*Allium cernuum* Roth.
ts'eex̲	juniper (about knee to mid-thigh high)	*Juniperus communis* ?and *J. scopulorum*
ts'idipx̲s	highbush cranberry	*Viburnum edule*
sgantsidipx̲st	highbush cranberry bush	*Vibernum edule*
umhlxum miinhl gan	moss underneath the trees	terrestrial forest floor Musci
umhlxw	moss; diaper moss	*Sphagnum magellanicum* (long, pale) and perhaps other spp.; Musci in general
umhlxum 'yip	moss-on-soil; terrestrial mosses	terrestrial Musci
wihl	yellow cedar	*Chamaecyparis nootkatensis* (D. Don) Spach
x̲aadax̲	unknown spiky plant with three parts	
x̲hlaahl	red osier dogwood	*Cornus stolonifera* Michx.
xhle'e	amabilis fir	*Abies amabilis* (Dougl.) Forbes
xsduu'lixs **sganxsduu'lixs**	baneberry, fairy bells and twisted stalk baneberry, fairy bells and twisted stalk	*Disporum hookeri* (Torr.) Nicholson, *Actaea rubra* (Ait.) Willd, and *Streptopus amplexifolius* (L.) DC.
x̲sneenauntwxt	yarrow and pearly everlasting	*Achillea millaefolium* L. and *Anaphilis margaritacea* (L.)B. & H.
'yans (E)/**'yens** (W)	'leaves', herbaceous plants	

that are morphologically based, encompass a number of named generics, and are transitive (Atran 1985, 1990; Berlin 1992; Brown 1994).

An adequate terminology for major plant groupings which do not satisfy these conditions is problematic. Some authors of the "intellectualist" school would maintain that groupings based on other criteria are not part of the general purpose ethnobiological classification of a cultural group (Atran 1990; Berlin 1992; Brown 1984).

Others, such as Eugene Hunn (1982), Nancy Turner (1987), Brian Morris (1984) and Alejandro de Ávila (personal communication 1995), whose positions have sometimes been characterized as "utilitarian" would suggest that *a priori* limiting consideration to morphologically based life forms may obscure understanding the ordering of the cognitive domain as experienced by members of the study community. In a previous paper (Johnson-Gottesfeld and Hargus 1998), I chose to retain the term life form for major plant groupings, despite some differences in defining characters from authors such as Berlin (1992), Atran (1985, 1990) and Brown (1984). In light of possible confusion caused by retention of the term life form while rejecting important aspects of the original authors' criteria, I will here adopt the more neutral "major plant group" to include all large groupings of plants, whether based on morphological gestalt or other characters, and whether encom-

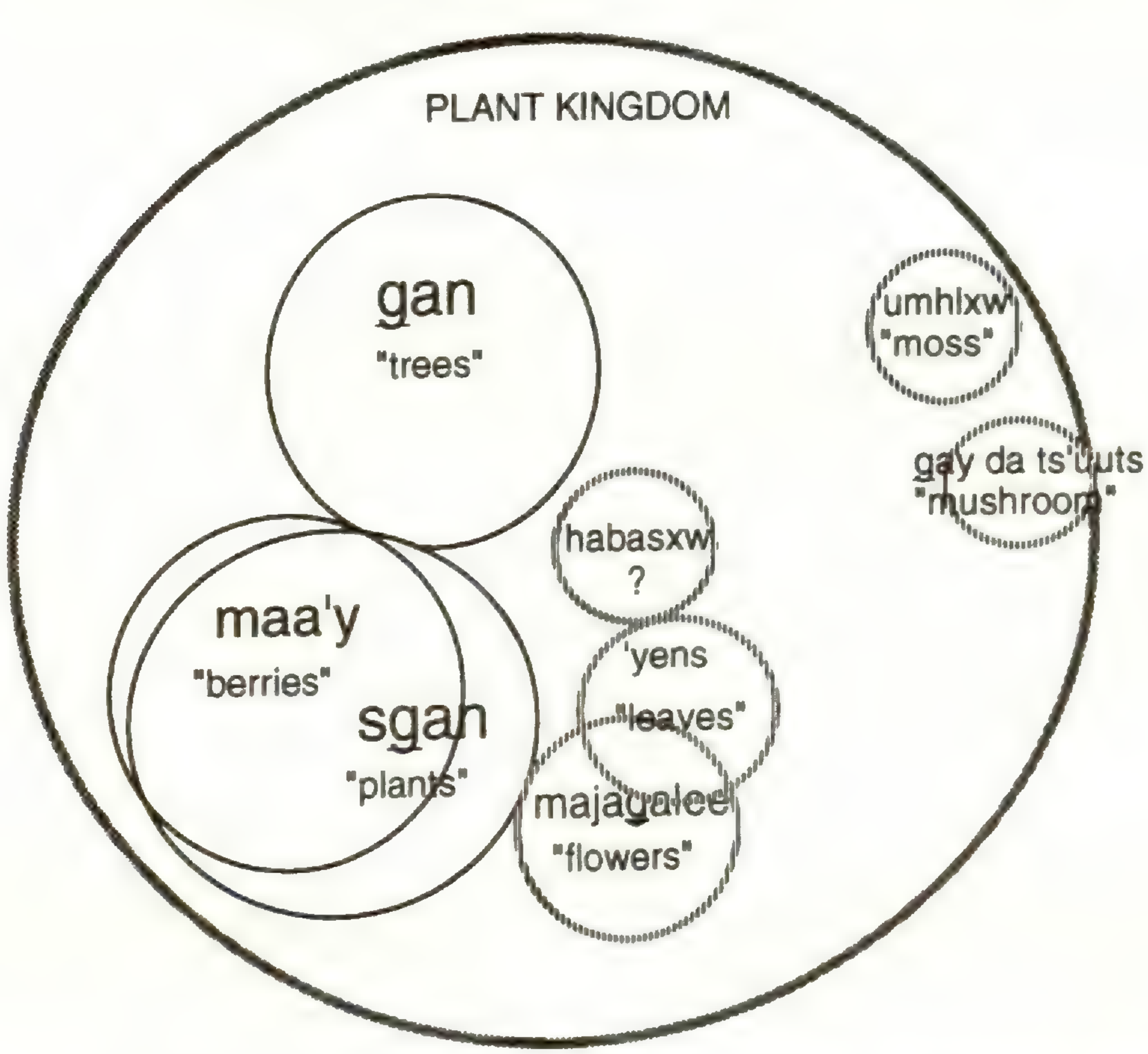


Figure 2.– Gitksan Plant Classification: schematic relationship of broad plant classes. Major plant classes which contain contrast sets of numerous named generics are bounded with solid black lines. "Empty life forms" are shown with vertical dashed lines. The semantic domain "floral form" or "plant kingdom" is outlined in gray.

TABLE 2.– Major Plant Group Affiliations of Gitksan Generics

Gan	'Trees'	Sgan	'Plants'	M'aay	'Berries'	'Yans/'Yens	'Leaves'
am'mal (E)	cottonwood	**sgan naxnok**	juniper	**maa'ya gaak**	black twinberry	**ts'anksa gaak** (?)	nodding onion
am'mel (W)	cottonwood	**sgansxduu'lixs**	'bear's berries'	**maa'yhl litsxw**	Queen's cup	**'yans** (E)	'leaves'
amk'ooxst	aspen	**sgandaxdo'ohl**	Labrador tea	**maa'yim hagwiluxw**	strawberry bramble	**'yens** (W)	'leaves'
am'wasaan	willow tree	**sganmaa'yagaak**	black twinberry	**maa'ytxwhl smax** (E)	'bear's berries'	**sdetxs** (?)	stinging nettle
amgiikw	hemlock	**sgansa'angitl'**	mountain ash	**maa'ytxwhl smex** (W)	'bear's berries'		
amhaawak	birch	**sgant'imi'yt**	kinnikinnik	**maa'y welgan**	blue currant		
haawak	birch	**sgants'ak'** (E)	hazel bush	**maa'ya ganaa'w**	trailing raspberry		
amhat'a'l	red cedar	**sgants'imwil'oo'o**	swamp currant	**maa'ya smex**	Queen's cup		
amluux	alder tree	**sgantya'ytxw** (E)	snowberry bush	**maa'ya luulak'** (W)	snowberry		
giist (?)	mountain alder	**sgantye'ytxw** (W)	fool's huckleberry	**miik'ooxst**	salmonberry		
hoo'oks (E)	subalpine fir	**sgan'ax**	woodfern plant	**miidoots**	strawberry		
hoo'oxs (W)	subalpine fir	**sgan'eluuts'ook**	chokecherry tree	**miigan**	highbush blueberry		
hluugan	mountain hemlock	**sgangam** (E)	saskatoon bush	**miigunt**	strawberry		
k'ooxst	Douglas maple	**sgangem** (W)	saskatoon bush	**miik'ooxs**	salmonberry		
seeks	spruce	**sgangak'oyp**	bunchberry plant	**miits'ook'**	chokecherry		
sginist	pine	**sganhaxdekw**	'bow plant'	**milkst**	wild crabapple		
simgan	red cedar	**sganis**	soapberry bush	**'miyahl** (E)	lowbush blueberry		
wihl	yellow cedar	**sgankale'est**	rose bush	**'miyehl** (W)	lowbush blueberry		
		sganleek	dogbane plant	**naasik'**	raspberry		
		sganmilkst	crabapple tree	**nisk'o'o**	thimbleberry		
		sgansnaw	pincherry tree	**is**	soapberry		
		sgansnax	hawthorne bush	**dilawsa**	gooseberry		
		sgantsek' (W)	hazel bush	**gale'e/k'ale'e**	rose hips		
		sgantsiks	Indian hellebore plant	**gam**	saskatoon		
		sgantsidipxst	highbush cranberry	**gadimis**	black huckleberry (black fruit)		
		hissgant'imi'yt (?)	wintergreens etc.	**simmaa'y**	black huckleberry general and dark bronze fruited form		
		sganloots'	red elderberry	**ts'idipxs**	highbush cranberry		
				sbikst	highbush cranberry		
				k'ots (?)	Solomon's seal		
				t'ipyeest (?)	'lavaberries'		
				t'imi'yt (?)	kinnikinnik		
				loots' (?)	red elderry		

Majagalee	'flowers'	Habasxw	'grass'	Gayda ts'uuts	'fungus'	Umhlxw	'moss'
majagalee	'wildflower'	**habasxw**	'hay' or grass	**gayda ts'uuts**	fungus	**umhlxum miinhl**	'moss under trees'
ihlee'em ts'ak	'bleeding nose'	**habasxum t'ax**	lake grass	**'maskwa luuluk'** (E)	*Lycoperdon* spp.	**umhlxw**	moss
xsneenauntwxt	yarrow / everlasting			**mihlxwhl**	'birch fungus'	**umhlxum 'yiip**	'moss on soil'
hagimgasxw	'wiping plant'			**diuxw**	'birch fungus'	**gaanaxws**	unidentified falcate

passing a relatively large contrast set of generics, or few to none. I consider these groups to contrast at the level of Berlin's life form rank (1992).

Three of the Gitksan major plant groups are large groupings encompassing a number of named subordinate generics: ***gan*** 'trees' (approximately 15 types),[2] ***sgan*** 'plants' (approximately 26 types), and ***maa'y*** 'fruit plants' (approximately 26 types) (see Table 2). The remainder are residual taxa which are empty in the sense of Turner (1974), containing few or no named subtypes (ranging from 4 to 0), though comprising forms of morphological and taxonomic diversity: ***habasxw*** 'grass' or 'hay,' ***'yans/'yens*** 'leaves' or 'herbaceous plants,' ***majagalee*** 'flowers,' ***umhlw*** 'moss,' and ***gayda ts'uuts*** 'fungi'. The precise nature of these groupings is open to debate; one could also perhaps consider them unaffiliated generics of distinctive habit (cf. Berlin 1992), or small intermediate groupings. As indicated in Figure 2, fungi seem to be peripheral to the concept of 'plant' and are not similar to any other types of plants,[3] which indeed reflects their fundamentally distinct biology and is paralleled by the modern scientific classification of fungi as a separate kingdom, of equal rank with 'plant' and 'animal.'[4] Lichens may form an unaffiliated intermediate; no overall term linking the several named classes was offered by consultants, and no mention of similarity to other types of plants was made.

Within the major plant groups are found numerous generics, or basic kinds, which roughly correspond to the species and/or genera of the scientific botanical classification system (see Table 1). A smaller number of covert intermediate groupings of generics are also found (see discussion below). Some generics, and some intermediate groupings may not be subsumed in major plant groups, and may in fact be unaffiliated, a situation reported by other authors (Berlin 1992; Taller de Tradiccion Oral and Beaucage 1987).

Major Plant Groups.– ***Gan***, Gitksan trees, (see Table 2) comprise forms that are tall and woody, which are used for their wood and/or bark for technological purposes and for medicine or food. Height relative to people, large size and woodiness appear to be the primary diagnostic characters. The word ***gan*** is employed to indicate forest, 'among the trees' (***spagaytgan***). It is also the term for the tissue wood. Many tree names are of the formula 'good for___' (***am___***). Three examples are ***am 'mal*** (cottonwood, 'good for canoe'), ***am k'ooxst*** (aspen, 'good for maple'), and ***amgiikw*** (hemlock, 'good for hemlock'). Other names of this type can be found in Tables 1 and 2. This type of name is only found for tree species, though not every tree has a name of this type.

Sgan 'plants,' seems to be a more heterogenous grouping; I have included plants in this group for which consultants spontaneously used the 'plant' term ***sgan*** as part of the name when discussing the plant. Morphologically, these range from small trees and large shrubs, to small shrubs and evergreen perenniel subshrubs, to large herbs, including at least one fern species. The boundaries between ***sgan*** 'plant,' and ***'yans/'yens*** 'leaves,' may be somewhat fuzzy, and some smaller herbaceous forms such as *Cornus canadensis* (***sgangapk'oyp***) are included in ***sgan*** (see Table 1 for a complete listing of Gitksan, English and scientific names of species). Taxonomically, gymnosperms, dicotyledonous and monocotyledonous angiosperms and ferns are included in this diverse class. Although consultants consistently offer 'plant' as the translation of the term ***sgan***, Tarpent has analysed /***sgan***/ to mean 'support' (Compton *et al.* 1997). On deeper probing, some con-

sultants suggest a linkage between ***sgan*** and 'stem,' which is consistent with Tarpent's interpretation.

Plants in this grouping are often called by the name without the preceding 'plant' term, as ***loots'*** instead of ***sganloots'***. Taxa in this grouping overlap extensively with the 'berry' grouping; most, or perhaps all 'berries' are also 'plants.' In fact, in some cases the name, when used without the preceding ***sgan*** suggests the berry rather than the entire organism, as ***t'imi'yt*** (***kinnikinnick*** fruit) versus ***sgant'imi'yt*** (***kinnikinnick*** plant). Which term is used depends on the situation in part, i.e., whether the plant body or the fruits are the focus of attention.

The third evident grouping of plants is that of fruit-bearing species, or 'berries,' (***maa'y***).[5] The primacy of berries in the Gitksan diet is reflected in the importance of having berries as a perceptual character of plants. I was often asked, for example, when presenting fresh plant specimens for identification, what the 'berry' was like, or if it had berries. The berry grouping contains the largest number of named types; at least ten of these are shared with the 'plant' group (see Table 2). This grouping is clearly focussed on edible fruits; plants with inedible berries such as black twinberry, *Lonicera involucrata*, seem to be peripheral members of the class.

The empty major plant categories seem to be ecologically important groupings of plants of distinctive morphology which are of little economic importance; within or associated with these life forms may be a few types of economic importance, which appear to serve as prototypes. For example, in the moss grouping, which includes all terrestrial and aquatic or wetland moss species as well as perhaps morphologically similar vascular plant forms such as *Huperzia selago*,[6] the prototype is clearly "diaper moss" (***umhlw***), large pale *Sphagnum* species which grow in wetlands and were traditionally important for diapering and menstrual needs (Johnson-Gottesfeld and Vitt 1996). As is common in folk classifications, the prototype is unmarked (e.g., Ellen 1993: 83,85; Gottesfeld 1993; Johnson-Gottesfeld and Hargus 1998; Hunn and French 1984; Turner 1987). Mosses from other environments are designated by descriptive phrases 'moss-on-soil' (Jeff Harris Sr. interview notes 10/19/87) or 'moss-under the tree' (e.g., *Rhytidiadelphis triquetrus*, a forest floor "feather" moss) (Olive Ryan interview notes 7/25/95). One moss or liverwort (uncollected), reputed to form good waterproof bedding or thatch, has its own name.[7]

The fungus grouping comprises "mushrooms," the fleshy fruiting bodies of basidiomycetes and some ascomycetes, and "conks" (bracket or shelf fungi), the woody perenniel fruiting bodies of polypores, woodrotting fungi. They are all referred to as ***gayda ts'uuts'*** 'bird hat' or metaphorically 'penis,' whether fleshy mushrooms on soil or woody polypores on trees or rotting logs. The two types distinguished by generic names are polypores on birch trunk which could be glossed in English 'birch fungus,' and certain puffballs, which are called 'ghost fart' ***masxwa luulak'*** (E)/***mesxwa luukak'*** (W).[8] 'Birch fungus' is called by two alternate terms, ***mihlxw*** 'charred,' or ***diuxw***; it comprises at least two distinct Linnean species, the cinder conk *Inonotus obliquus* (Gottesfeld 1992) and *Fomes igniarius*. Similar appearing species growing on hemlock trunks, for example, have no distinctive name, and are simply called ***gayda ts'uuts'***. Despite the great variety and

abundance of fungal species in the environment, and their seasonal salience, only the species growing on birch, which have economic use, and the perceptually salient and uncanny puffballs are named. No species of fleshy fungi were traditionally eaten by the Gitksan.

The situation with the three major plant groups encompassing herbaceous species is not entirely clear. They are groupings which cluster around the prominence of plant organs, i.e., the possession of conspicuous flowers or large leaves with no woody stem, or habit (in the botanical sense, that is, characteristic form of growth, particularly for graminoid plants). Few herbaceous types have economic uses or are distinguished with names, and a certain degree of overlap may be present between classes, for example, ***'yans/'yens*** 'leaves' and ***habasxw*** 'hay,' or ***'yans/'yens*** 'leaves' and ***majagalee*** 'flower,' depending on the focus of discussion.

Graminoid plants in recent times have had two economic uses: a certain 'swamp' or lakeshore type (probably a sedge or bulrush) was used for a type of basketry, and since the introduction of domestic livestock, grasses and sedges have had importance as winter feed and pasturage.

'Yans/'yens 'leaves' seems significant as a residue of small and inconspicuous plants, and ecologically describes herbaceous ground cover or undergrowth. No named generics were unequivocally associated with this group. Luke Fowler told Harlan Smith in 1926 that the introduced dandelion (*Taraxacum officinale*) was ***'yens***.[9] Sometimes the term ***'yens*** can be translated "plant"; the topical section in a bilingual Gitksan dictionary entitled (in English) "Names of Trees, Plants, and Flowers" used the term ***'yens*** along with ***gangan*** 'trees' and ***majagalee*** 'flowers' in the Gitksan title.[10]

TABLE 3.– Plants Identified as 'Flowers' by Harlan Smith's Consultants in 1925-26

Latin Name	Common Name	Smith's orthography	Gitksan term
Mentha arvensis	field mint	mezerul	**majagalee**
Heuchera glabra	alum root	skan mezerul	**sgan majagalee**
Parnassia palustris var. *montanensis*	grass-of-parnassus	skan mizerlay	**sgan majagalee**
Corydalis aurea	golden corydalis	megerle	**majagalee**
Clematis columbiana	Virgins-bower	mezerul	**majagalee**

Majagalee 'flowers' are conspicuous in season, especially in environments like subalpine meadows or alpine tundra. The term applies both to the plant organ, as in the rose, which has flowers, but for the Gitksan, is not a 'flower,' and to what would be called in English "wildflowers." A few flower types have names, and will be discussed as examples in the *Generics* section (see also Table 2). The common and conspicuous red columbine and Indian paintbrush are designated ***ihlee'em ts'ak*** 'bleeding nose.' It is probably the perceptual saliance of these forms because of their brilliant colour which causes them to be named; symbolic significance is also possible. Another generic which may be a 'flower' is ***xsneenauntwxt***, which is composed of two common white flowered composite species of similar stature, pearly everlasting (*Anaphalis margaritacea*) and yarrow (*Achillea millaefolium*). The

two peavine species (*Lathrys nevadensis* and *L. ochroleucus*), common understory herbs with vivid purple or cream flowers, are a third possible 'flower' generic. They are lumped by the Gitksan as ***hagimgasxw*** 'wiping plant,' named for their use in wiping the slime off of salmon skin during fish processing.

In the 1925 and 1926 Harlan Smith collected names for various plants we would call wildflowers, including in addition to those mentioned above, mountain avens (*Dryas drummondii*), sweet cicely (*Osmorrhiza* spp.), goatsbeard (*Aruncus sylvester*), and others. The names in general are either descriptive of uses ('wiping plant' for peavine) or are coordinate ('resembling spreading dogbane' for goatsbeard and sweet cicely). In addition, there were five species simply called 'flowers' or, interestingly 'flower plant' (Table 3), and a number of types which had no names (Table 8).

The prototypes of the two most economically important major plant groups, ***gan*** 'trees,' and ***maa'y*** 'berries,' are named 'real or true': ***simgan*** 'real tree' or 'wood,' the western red-cedar *Thuja plicata*, and ***simmaa'y*** 'real or true berry,' the black huckleberry *Vaccinium membranaceum*.

TABLE 4.–Plants of Unknown Affiliation

Gitksan name	English meaning	probably **sgan**	ambiguous or other
gahldaats	yellow pond lily		√
gasx̲	riceroot lily	√	
haast	fireweed	√	
ha'mook̲	cow parsnip	√	
hagimgasxw	peavine		√
hoobixs 'wiigat	Queen's cup		√
isxum sgan'isxw (E)	'smelly plant' valerian, mint?	√	
isxum sk̲'ooks (W)	'smelly plant' valerian, mint?	√	
k̲'awts	'wild carrots' and carrots	√	
wa'umst	devil's club	√	
x̲sneenauntwxt	yarrow and everlasting		√
x̲hlaahl	red osier	√	
hisgahldaatsxw	water arum, calla lily		√

The major plant group affiliation of a number of taxa remains unclear (Table 4), including distinctive, important, and widespread plants such as devil's club. Whether, for example, its unique morphology and impressive spininess, actually create a unique and unaffiliated position, or whether its singularity and salience simply make reference to a major plant grouping unnecessary because of its very familiarity, remains unclear. Other plants whose affiliations with "life forms" are unclear include large fleshy herbs whose roots, rhizomes or underground parts are used : yellow pond lily, an important medicinal plant, and cow parsnip, important both for medicinal roots and for its edible stems.

In 1996 I conducted several interviews to address the issue of classification of these ambiguous plants, and the nature or meaning of the general term ***sgan***. When I asked the most elderly and fluent consultant I interviewed in 1996 whether one could say ***sgan*** ___ for several plants of ambiguous affiliation, she appeared to find

the question odd, and simply repeated the plant names without ***sgan***, confirming that in ordinary speech there are a series of plants with which one cannot generally substitute ***sgan*** + name for the name itself (O. Ryan 9/10/96 and 9/20/96.)

A second consultant, the daughter of the elder mentioned above, felt that none of the plants on my list of 12 forms could be called ***sgan*** ___.[12] For her, the word ***sgan*** carries connotations of the annual cycle and the bearing of fruit, rather than necessarily a sense of stature (J. Ryan 9/10/96.) The aquatic habit of yellow pond lily gave one consultant some hesitation, and she indicated that for her, ***sgan*** carries a terrestrial and upright connotation, usually with woody or distinct stems (B. Anderson 9/7/96). Familiarity was suggested by one consultant as the reason that devil's club, rice-root lily (*Fritillaria camschatcensis*) and fireweed (*Epilobium angustifolium*) were not generally referred to as ***sgan*** (Art Mathews Jr 9/15/96.) Another consultant used appropriate Gitksan questions to elucidate the affiliation of various plants (S. Howard notes 9/14/96). Her response suggests that, depending on stature, one could ask :

Gwilx la gan de tun? What kind of tree is this?

Sgan gwi tun? What kind of a plant is this?

Gwilx la 'yens si tun? What kind of 'leaves' is this?

She indicated that for her ***xhlaahl*** (red osier dogwood), ***gasx*** (rice-root lily), and ***ha'mook*** (cow parsnip) are ***sgan***. Art Mathews indicated a possible ecological slant: if one wanted to talk about a bear walking through cow parsnip, one would say that the bear is in the ***sganha'mook*** (transcript 9/15/96.)

Some of the terms on my initial list seem to fit into the broader classification scheme with more or less ease, such as red osier dogwood and Sitka valerian. Others, as suggested above, probably are grouped with ***sgan***, but are highly salient and important plants, as well as somewhat distinctive in morphology. A last grouping includes unusual plants such as the emergent aquatics yellow pond lily and water arum, the fleshy leaved stonecrop, and low growing herbaceous plants such as Queen's cup, which may in fact be unaffiliated, or not members of ***sgan***. Queen's cup may be a berry, or perhaps a 'leaf' or 'flower,' but in the absence of evidence which indicates how it is perceived by Gitksan people, I prefer to consider it and other ambiguous forms unaffiliated.

Intermediates.– Below the major plant group or life-form rank, one can distinguish a jumble of covert groupings and isolated generics, which may or may not be included in any superordinate classes below the general rank of "plant kingdom" or "floral form." Several such groupings are suggested in Table 5. Some covert groupings seem to be cross-cutting, as indicated by the fact that evergreen conifers are found in both the ***sgan*** and ***gan*** groupings (coniferous trees being ***gan*** and the shrubby or small tree *Juniperus* species being ***sgan***). Similar patterns of relationship of intermediate groupings to life forms are found among the Sierra Nahuatl (Taller de Tradicíon Oral and Beaucage 1987.) Other small clusters may be indicated by coordinate naming patterns, such as the horsetails, or the aquatic grouping formed by yellow pond lily and wild calla (Figure 3). These clusters of plants have distinctive habits, and, in the case of the pond lily group, habitats.

By the criteria employed by Taylor (1990) evergreen coniferous trees would be

TABLE 5.–Postulated Intermediate Groupings

'ferns'	
damtx (E)/**demtx** (W)	inedible fernrootstock, *Athyrium filix foemina, Dryopteris felix-mas,* and *D. expansa,* in part
ax	edible fern rootstock, *Dryopteris expansa* in part
hap'iba'a	bracken, *Pteridium aquilinium*
hisdemktxwt	licorice root fern, *Polypodium glycyrrhiza*
'clubmosses'	
belena 'watsx (E)/**belena 'wetsx** (W)	various *Lycopodium* spp.
xaadax	unknown
'horsetails'	
hismaawintxw	various *Equisitum* spp.
maawin	*Equisetum hiemale* and *pratense*
'conifers or evergreens'	
amgiikw	hemlock, *Tsuga heterophylla*
hoo'oxs	'balsam', subalpine fir, *Abies lasiocarpa*
seeks	spruce *Picea* x *Lutzii*
sgannaxnok or **laxsa laxnok**	common and rocky mountain juniper, *Juniperus communis* and *J. scopulorum*
sginist	lodgepole pine, *Pinus contorta*
simgan or **amhat'a'l**	western red cedar, *Thuja plicata*
wihl	yellow cedar, *Chamaecyparis nootkatensis*
xhlee'e	amabilis fir, *Abies amabilis*
'alders'	
giist	'mountain alder', *Alnus crispa*
amluux	alder, *Alnus incana* and *A. rubra*
'willows'	
xhlaahl	'red willow', *Cornus stonolifera*
'waasan and **am'waasan**	willow, *Salix* spp.
? **giist**	'grey willow', *Alnus incana*
'kinnikinnick and relatives'	
sgant'imi'yt	kinnikinnick *Arctostaphylos uva-ursi;* and low bush cranberry? *Vaccinium vitis-idae*
hisgant'imi'yt	prince's pine, *Chimaphila umbellata;* false box, *Pachystima myrsinites;* and ?wintergreens, ?*Pyrola* spp.
'bear's berries'	
maa'ytwhl smex	wild sarsaparilla, *Aralia nudicaulis*
maa'ya smex	Queen's cup *Clintonia uniflora;* rosy twisted-stalk *Streptopus roseus;* star-flowered Solomon's seal, *Smilacina stellata;* and ?three-leaved Solomon's seal, ?*S. trifoliata*
xsduu'lixs	baneberry, *Actaea rubra;* clasping-leaved twisted-stalk, *Streptopus amplexifolius,* and Hooker's ferry bells, *Disporum hookeri*
hissgank'ots	star-flowered Solomon's seal, *Smilacina stellata;* and ?three leaved Solomon's seal, ?*S. trifolia*
lichens	
gesgan	'tree hair', arboreal fruticose lichens
ligimthl gan	'tree fur', arboreal fruticose lichens
gwilalh ganaa'w	'frog blankets', *Lobaria* spp.

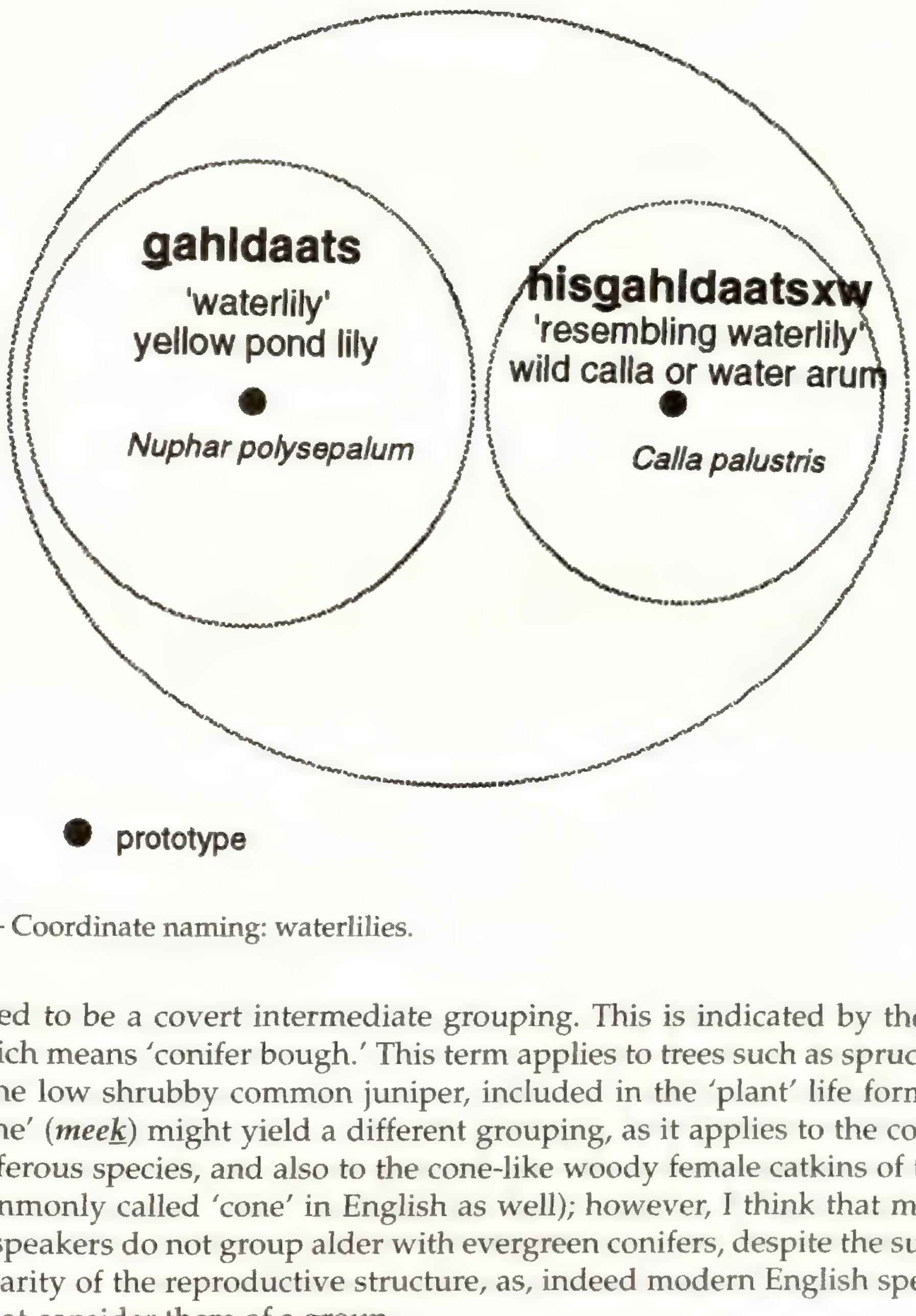


Figure 3.– Coordinate naming: waterlilies.

considered to be a covert intermediate grouping. This is indicated by the term ***laxs***, which means 'conifer bough.' This term applies to trees such as spruce, and also to the low shrubby common juniper, included in the 'plant' life form. The term 'cone' (***meek***) might yield a different grouping, as it applies to the cones of any coniferous species, and also to the cone-like woody female catkins of the alders (commonly called 'cone' in English as well); however, I think that modern Gitksan speakers do not group alder with evergreen conifers, despite the superficial similarity of the reproductive structure, as, indeed modern English speakers also do not consider them of a group.

The three Linnean species of alder, grouped in two indigenous generics, are perceived as similar (Figure 4). Both possess the distinctive alder 'cones' (***meek***). Similarly, the linguistic confusion for Gitksan speaker in English between 'red willow' and 'yellow willow' or simply willow, indicates a possible grouping comprised of *Salix* species and *Cornus stolonifera*. The overlap of their uses in basketry as well as similarity of habitat and growth from of shrubby willows with red osier dogwood may be the basis for this grouping.[12]

Three generics of fern are also perceived as similar based on distinctive plant habit; a fourth smaller generic is named in coordinate fashion (Figure 5). These are

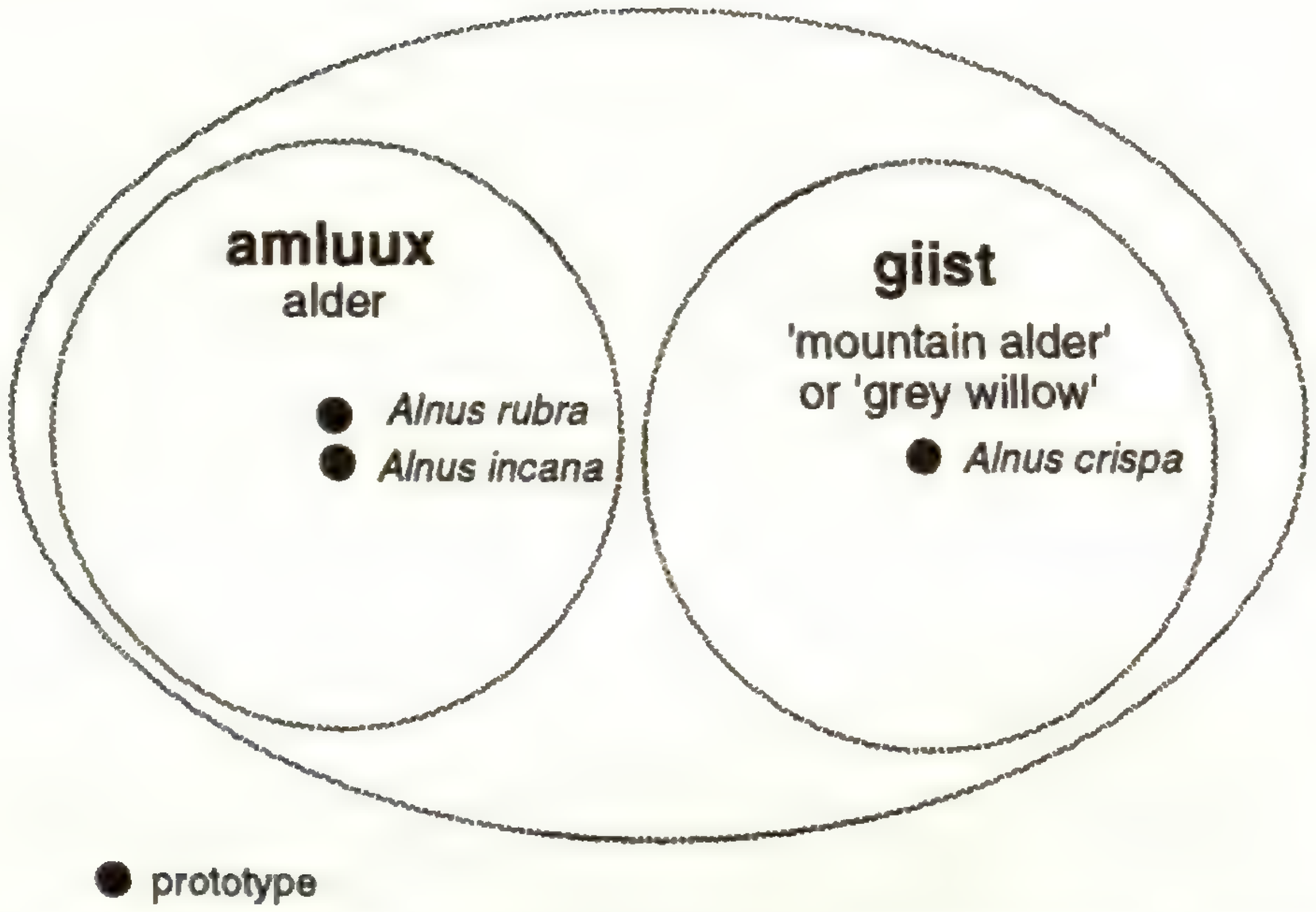


Figure 4.– Distribution of scientific species of *Alnus* in relation to the two Gitksan generics within the postulated intermediate 'alder.'

ax 'edible fern root' (spiny woodfern, *Dryopteris expansa*, in part), ***damtx*** 'inedible fern root' (*Dryopteris expansa* with small rhizomes, *Athyrium filix-femina*, lady fern, and *Dryopteris felix-mas*, male fern), and ***hap' iba'a*** (bracken fern, *Pteridium aquilinum*).[13] They are distinguished, perhaps, because only **ax** has an edible rhizome, which was formerly an important winter carbohydrate food. The small and locally uncommon licorice fern (*Polypodium glycyrrhiza*) was called by one consultant ***hisdemktxwt*** in recognition of its similarity in habit to the larger fern species, but its small size would preclude confusion with ***ax***. The name means 'resembling ***demkt*** (inedible fern root).'

"Clubmosses" may perhaps be considered an intermediate grouping. Four botanical species of clubmoss (*Lycopodium clavatum, L. annotinum, L. complanatum* and *L. obscurum*) are all designated ***belena 'watsx***(E)/ ***-'wetsx***(W). The small alpine species *Lycoposium sitchense* was not designated by this term. Perhaps allied to these would be the fir clubmoss, *Huperzia selago*, considered by one consultant to be similar to the elusive taxon ***xaadax*** (David Green notes 7/24/95). However, another consultant considered this clubmoss to be an aberrant member of ***umhlw***, 'moss', which simply happened to have its several branches come together to form a single stem at the base, with a root apparent below (O. Ryan notes 7/25/95).

A grouping of inedible berries, called in English "bear's berries" ***maa'ya smex***, includes the Gitksan generics ***maa'ytwhl smex*** 'bear's berries,' ***maa'ya smex*** also 'bear's berries,' and ***xsduu'lixs*** 'teardrops' (Figure 6). ***Maa'ytwhl smex*** is a medicinal plant, wild sarsaparilla, *Aralia nudicaulis*, which has dark inedible berries. ***Maa'ya smex*** includes several other species with inedible berries, such as *Clintonia uniflora* and some of the species that also can be called ***xsduu'lixs***. ***Xsduu'lixs*** is

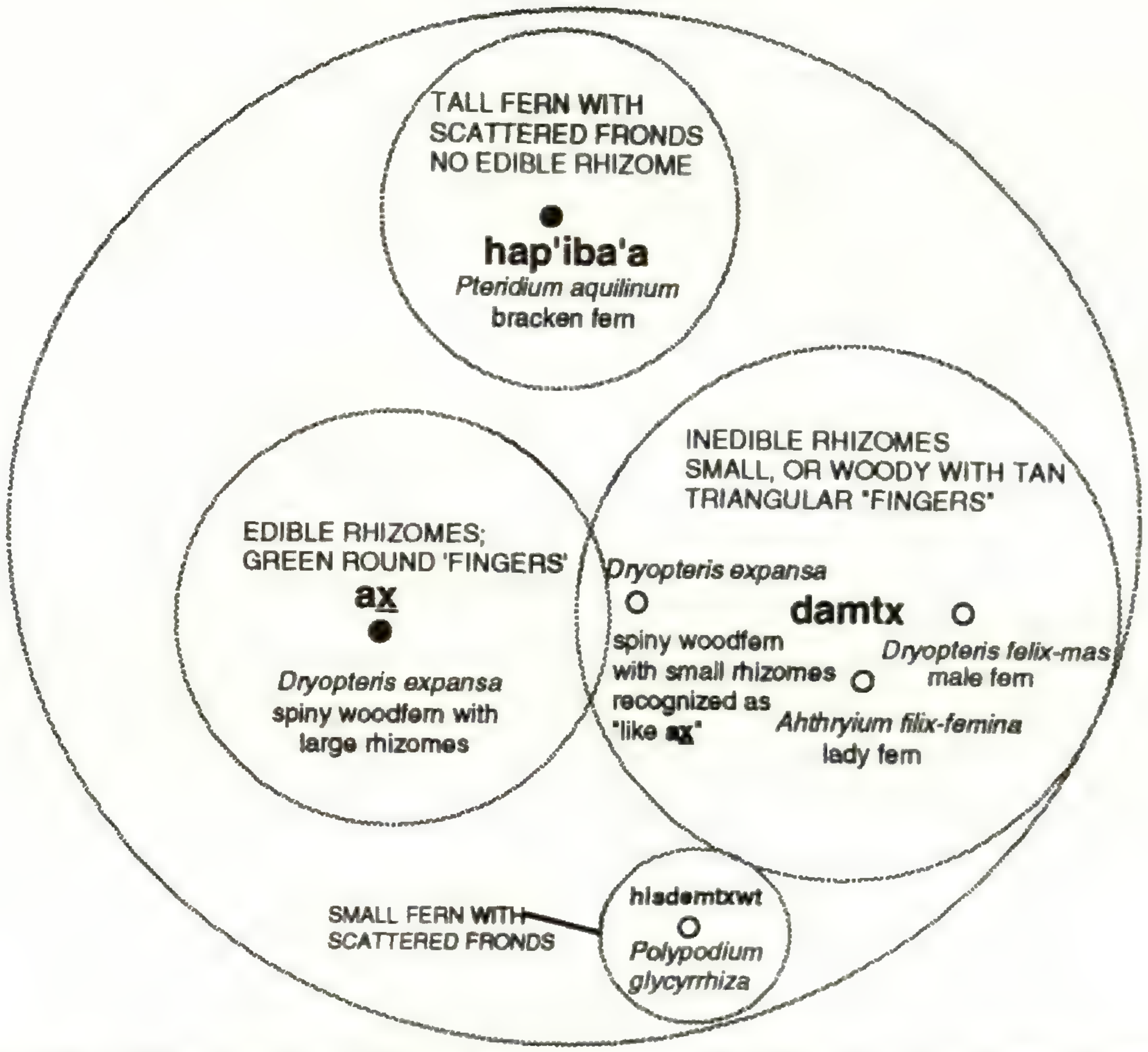


Figure 5.– "Fern" intermediate showing characters which differentiate the three Gitksan generics of large fern, and the small, uncommon coordinate ***hisdemktwt***.

a sort of catch-all for red-fruited large leaved herbs with leafy stems, and has no use, though the species are relatively common and conspicuous. *Smilacina ?stellata*, called ***hissgank'ots*** or resembling large false solomon's seal is included in the intermediate 'bear's berries' by Art Mathews, who writes, "This berry is one of the bear berries." (Mathews n.d.)

A last possible covert grouping includes the several lichen forms named by the Gitksan. These aberrant, morphologically and ecologically unique forms are sometimes lumped by ecologists with bryophytes, as "bryoids." Taxonomic botanists emphasize their connection with fungi, which provide the gross morphology of lichen "species." The Gitksan appear not to connect the arboreal 'tree hair' or 'tree fur' and 'frog blankets' (lungwort, *Lobaria* spp.) types with any other types of plants.[14]

Generics.– There are a number of basic kinds of plants recognized and named by the Gitksan (Table 1). These are generics in the sense of Berlin (1992) and other authors, or basic kinds in the sense of Taylor (1990). All of the local tree species (in the English and botanical senses) and the majority of woody shrubs are distinguished and named by the Gitksan. Likewise, most species of plants, whether

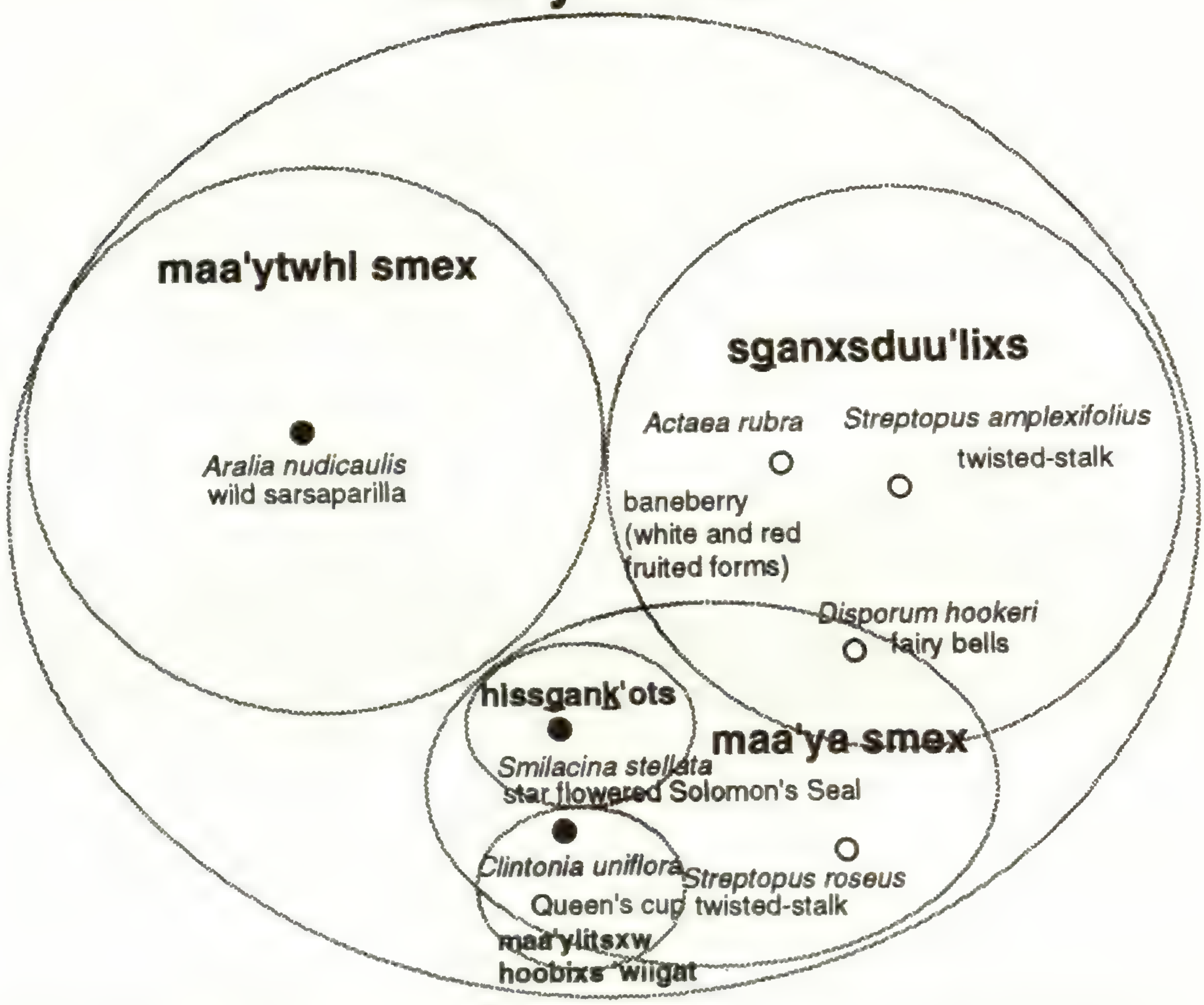


Figure 6.– The "bear's berries" intermediate grouping is a group of two generics of inedible fruits. ***Maa'ytwhl smex***, whose name means "bear's berries," is medicinal. ***Xsduu'lixs***, whose name refers to tears, is not. A third grouping, called ***maa'ya smex***, includes members of three named generics, and rosy twisted stalk. It may be an artifact caused by people referring to the botanical species within it by the intermediate group name, or it may constitute some kind of residuum for speakers who do not use the other generic names for the included forms.

shrubs or herbs, which have edible berries, are named. A number of herbaceous or low-growing perennials are also named and recognized.

The correspondence between species recognized in scientific taxonomy and the generics recognized and named by the Gitksan is variable (Figures 7, 8, and 9). For tree species, and the recognized edible species of the berry group, the correspondence seems to be one to one.[15] The two species of true fir, for example, *Abies lasiocarpa* (by far the most common in Gitksan territory) and *A. amabilis*, were given different names by Jeff Harris Sr., who said in English that amabilis fir was a different type of 'balsam' (the local common name of *Abies*). In other cases, a Gitksan generic term may encompass two or more separate species recognized by scientific taxonomy; these may be distantly related from the perspective of scientific botany, with mem-

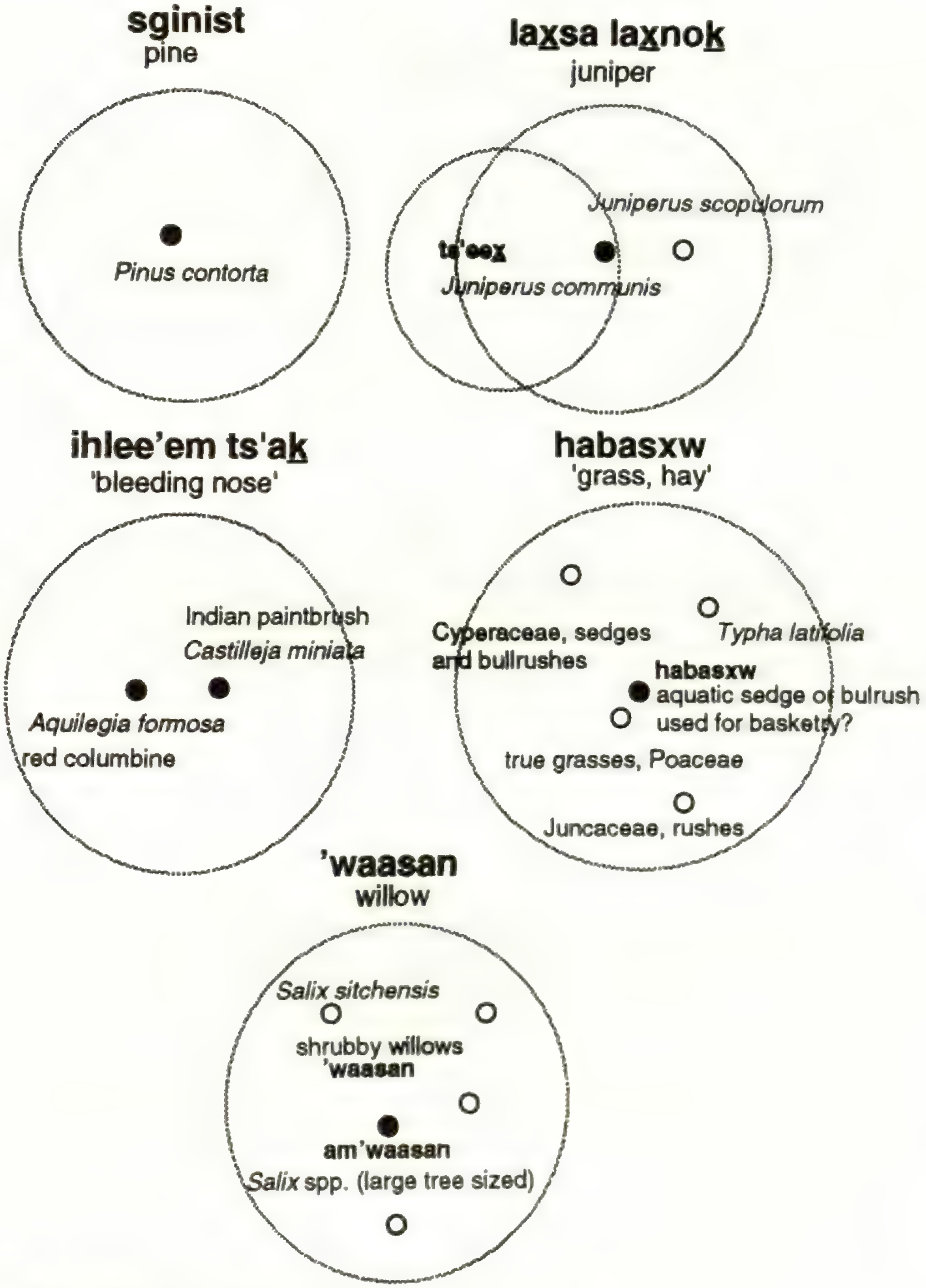


Figure 7.– A series of Gitksan generics, showing a range of relationships between Gitksan generics and scientific botanical species. For some consultants, *Juniperus scopulorum* is united with yew, *Taxus brevifolia*, both being designated 'bow plant' ***sganhaxwdaxw***.

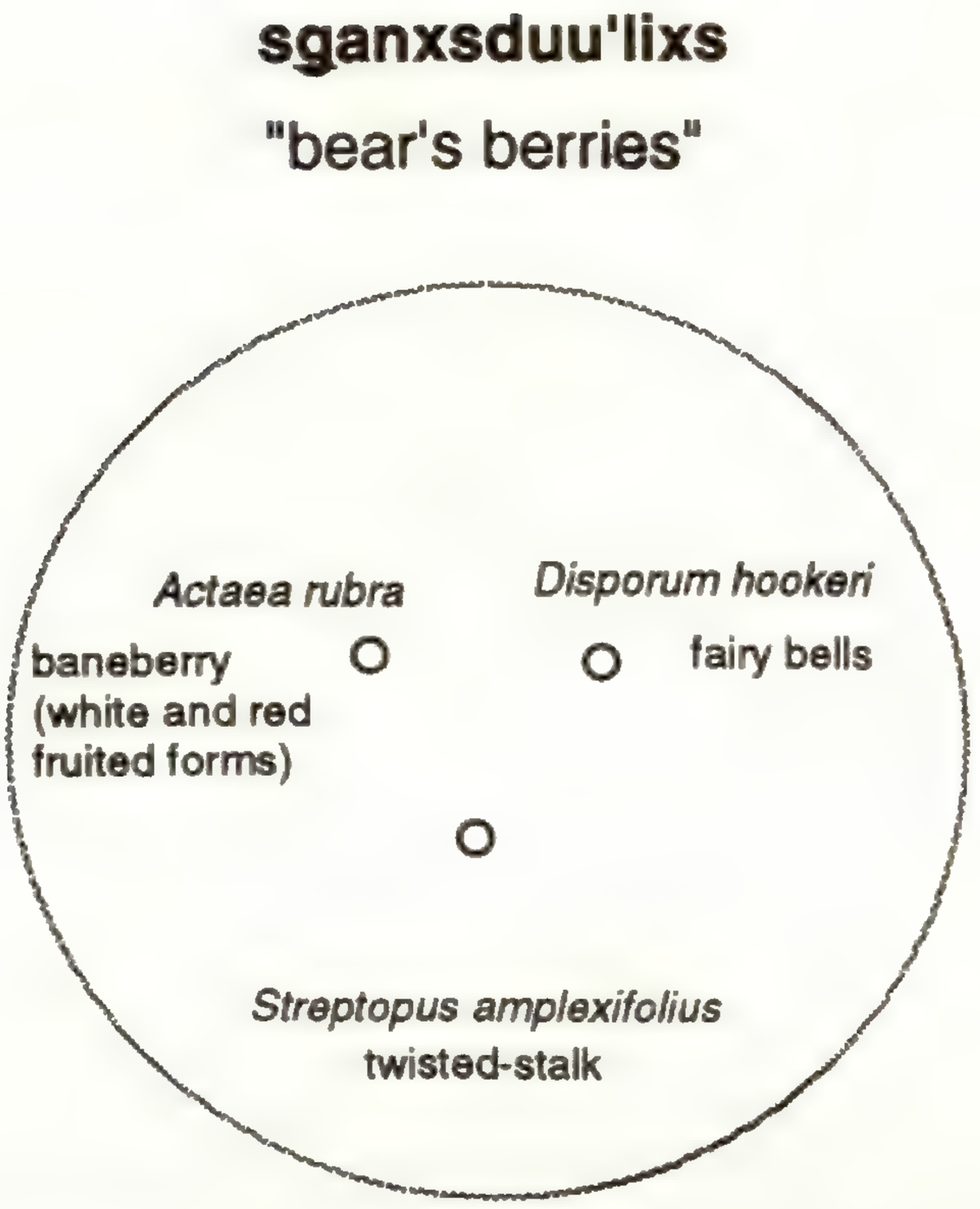


Figure 8.– The inedible fruit generic ***xsduu'lixs***, red fruited large leaved herbaceous plants with leafy stems. The scientific genera include monocotyledonous forms of the lily family (*Streptopus* and *Disporum*), and *Actaea rubra*, a poisonous member of the dicotyledonous buttercup family.

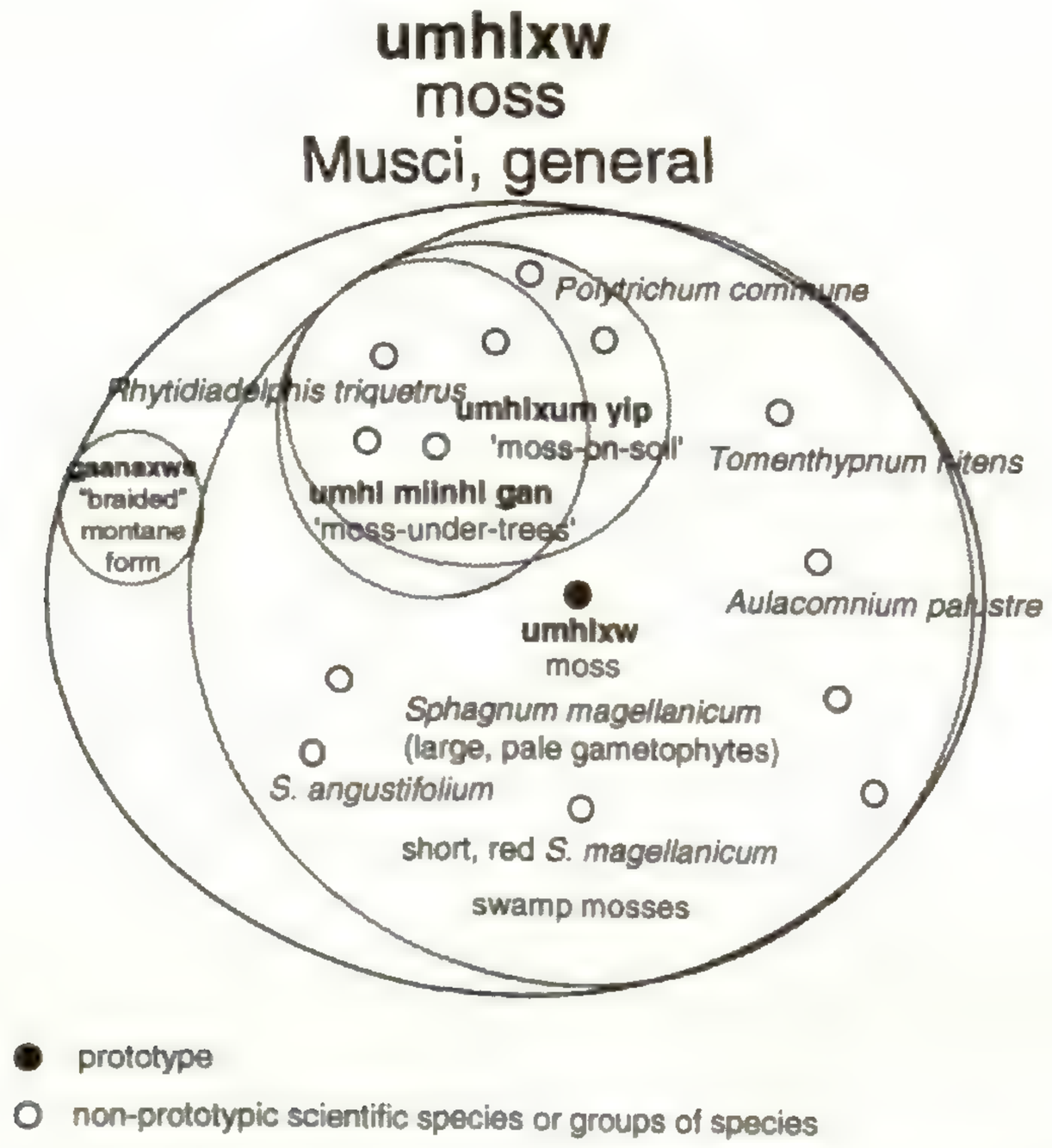


Figure 9.– Subtypes and distribution of scientific species within the bounds of the major plant class/ generic ***umhlxw*** 'moss.' Many more scientific species of bryophytes than those indicated are included in the moss category; for clarity only types that have been identified as ***umhlxw*** by consultants and determined to species by a bryologist are named here.

bers drawn from different botanical families. The nomenclatural uniting of two botanical species of juniper, *Juniperus communis*, a prostrate shrub, and *J. scopulorum*, a slow-growing tree, often with multiple stems, as ***laxsa laxnok*** is an example of two related species united as one generic. (Sometimes the tree form *J. scopulorum* may also be called "bow plant" and conceptually united instead with yew, *Taxus brevifolia*, which does not occur in Gitksan territory, though yew wood was obtained by trade). Two other pairs of scientific species united as single generics are the herbaceous flowering generics, ***ihlee'em ts'ak*** 'bleeding nose,' and ***xsneenauntwxt***. As noted previously, 'bleeding nose' denotes red columbine (*Aquilegia formosa*: Ranunculaceae), and Indian paintbrush,(*Castilleja miniata* : Scrophulariaceae), two species classified scientifically in different plant families, but which share the feature of striking scarlet flowers. The nectaries of the first are sucked by children, while the paintbrush may have been used medicinally in the past (Smith 1926:181).[16] ***Xsneenauntwxt*** comprises yarrow (*Achillea millaefolium*) and pearly everlasting (*Anaphalis margaritacea*), two common white flowered herbaceous plants in different subfamilies of the Asteraceae. The two subtypes have different uses, yarrow as a medicinal, and everlasting traditionally used for grave offerings. As discussed above, ***damtx*** 'inedible fern rootstock,' is defined by an economic character, lack of harvestable rhizomes. It comprises two Linnean species and part of a third (see Table 1) and is differentiated from ***ax*** , an edible fern rootstock, part of *Dryopertis expansa*, by either small size of rhizomes or woody, inedible texture. Another generic defined by disutility is ***xsduu'lixs*** (Figure 7). ***Xsduu'lixs*** 'tears' are large leaved herbaceous plants of approximately 30 cm height with leafy stems and red, inedible red fruits. The scientific genera include monocotyledonous forms of the lily family (*Streptopus* and *Disporum*) and a dicotyledonous form from the buttercup family, the poisonous *Actaea*. Another liliaceous herb of very similar appearance to *Disporum* and *Streptopus*, but with edible fruit, the false Solomon's seal (*Smilacina racemosa*) has a distinct name, ***k'ots***.[17] If habit and morphology were the primary diagnostic characters of ***k'ots***, rather than the edibility of its fruits, I would expect it to be included in ***xsduu'lixs*** rather than given a distinct name.

The exact boundaries of generics may be rather fuzzy, making it a judgement call whether a given cluster of forms should be considered one generic with a prototype and various satellite types of variable distance from the center (cf. Berlin 1992), or an intermediate composed of a focal type and a cluster of other generics related by coordination (cf. Hunn and French 1984). The naming and recognition of smaller and less perceptually salient plants is more variable than that of large, salient species like the common tree species, important berry plants, or significant shrubs. In particular, I noted variability in the referents of ***maawin*** 'scouring rush' and ***hismaawintxw***. All apply to species of *Equisetum*, both of 'horsetail' and 'scouring rush' form. For one consultant, both the northern scouring rush *Equisetum hyemale*, and the meadow horsetail, *E. pratense*, were ***maawin***, the prototype of this group, while common horsetail, *E. arvense*, and the small scouring rush, *E. scirpoides*, were peripheral, being designated by ***hismaawintxw***. For other informants, *E. hyemale* and the woodland horsetail *E. sylvaticum* were also designated by ***hismaawintxw***.

Three distinct species of clubmoss (*Lycopodium* species) are designated as ***belena 'watsx***, 'otter belt', by modern consultants (see Table 1). A fourth species of *Lyco-*

podium was reported by Smith in 1926 to have been called 'otter belt' (Smith 1926:54-55). This tidy picture is obscured, however, when we look further at Smith's data (Smith 1926:122), where we find that a buttercup, *Ranunculus abortivus*, is also designated by that term. Moreover, two other local clubmosses which grow in montane and alpine situations, *Huperzia selago* and *Lycopodium sitchense*, are not called ***belena 'watsx̲*** (David Green interview notes).

Binomial names like "blue oak" or "red alder" are extremely rare. Compound names which consist of two words are usually of the sort __'s berry, 'good or good for __', or 'real __', where the second term is a life form term and the prototypical species is so designated. The one documented binomial which is a secondary lexeme is the word for parsnip, ***maaxwsxwa k̲'awts*** 'white carrots', and is obviously a recent term. I elicited similar terms for colour phases of foxes which I think were loan translations or descriptions.

Deciding exactly how many generics exist in the Gitksan classification system is methodologically complex. Because there are six modern occupied villages, and two previously somewhat distinctive northern villages, there is considerable dialectical variation. This affects plant names. One species, the swamp currant, is given the name ***hlit*** in the western village of Gitwingax̲; however, a completely unrelated name, ***sgants'imwil'oo'o***, is applied to the shrub by an elder from the eastern village of Kispiox whose ancestors came from the northern village of G̲aldo'o. The latter term was reported from G̲aldo'o in 1926. Should these be tallied as one generic or two? The identity of the plant designated is recognized by speakers of both dialects, suggesting two names but one concept.

Synonymy is sometimes obvious. In these cases it seems that the underlying concept is constant, but two distinct different names may be applied, as in the two names for western red cedar, ***simgan*** 'real wood or tree' and ***amhat'al*** 'good for cedarbark.' Likewise, for several tree species, the tree can either be called ***am-***or simply by the term itself, as in ***amgiikw*** or ***giikw***, both of which mean hemlock, and which can be used interchangeably.[18] In these instances, I would count the pair of names as signifiying one generic. A third set of synonyms is recognized by informants as being two alternate names for the same plant such as ***'miigunt*** and ***'miidoots*** for wild strawberry, or ***mihlw*** and ***diux*** for 'birch fungus.' These also seem to clearly represent one generic. Sometimes similar terms are used interchangeably, such as ***lax̲sa lax̲nok̲*** and ***sgannax̲nok̲*** 'boughs of the supernatural' and 'supernatural plant,' both referring to junipers. These I also count as true synonyms, both representing one underlying generic.

It is more problematic where different consultants have given different terms for the same botanical species,[19] and do not appear to know other names, as in the three distinct names collected from different individuals for the botanical species *Clintonia uniflora* or the two names for *Symphoricarpos albus*. If one were talleying the number of botanical species recognized and named by Gitksan people, these clearly would be counted as synonyms, and only one generic would be counted. Similarly, in the botanical lexicon of each informant, only one generic is represented, so perhaps even if one is striving to represent indigenous concepts only one generic should be tallied. However, if one were counting names, clearly multiple names co-exist, and it is not clear that consultants count them as synonyms.

Another problem area exists when two Gitksan terms appear to apply to the

same botanical species, but not to be identical in meaning. ***Laxsa laxnok / sgannaxnok*** was given above for juniper (usually referring to *Juniperus communis*). An unrelated term, ***ts'ex***, is also glossed as 'juniper'. However, there is evidence that, for at least some informants, ***ts'ex*** and ***laxsa laxnok*** may represent different ecotypes, and that only the latter is 'supernatural' and spiritually powerful in medicinal contexts (Tribal Convention Notes October 16, 1986).[20] Other consultants appear to lump all juniper as ***laxsa laxnok***. Should these be considered two generics? One generic with two species? One generic with three synonyms? Another case where two related forms appear to designate different portions of the named entity is with ***'waasan*** and ***am'waasan***. ***'Waasan*** "willow" is the more common term, and applies broadly to shrubby or tree *Salix* species;[21] the consultant Jeff Harris Sr. who provided the term ***am'waasan*** apparently meant to contrast large, lowland tree-sized willows from shrubby species we encountered on a forested mountain slope. The tree sized willows have economic value for their tough and durable inner bark, used for tying and lashing. Shrubby willows are not utilized. Are these one generic with two species? Or two generics? I would prefer to regard them as prototype and extension of one broad generic.

A third area of uncertainty is whether the terms postulated for "empty life forms" are also generic concepts. There has been quite a bit of discussion of this issue in the literature (Atran 1990; Berlin 1992). Berlin (1992:175) rejects monogeneric life forms, and the idea that the same term can contrast both at the life form and at the generic level; he prefers to think of these as unaffiliated generics. I have tallied ***majagalee*** 'flower,' ***habasxw*** 'grass,' ***umhlw*** 'moss,' and ***gayda ts'uuts'*** 'mushroom, fungus' as generics as well as major plant groups, because they are used in conversation to designate specific plants, contrasting with other (botanically) more restricted names at the generic level. However, I am uncertain if ***'yans/'yens*** can be considered a generic rather than an ecological term, and catch-all for things not important or salient enough to distinguish with individual names. Taylor's distinction between residual taxa and residues would suggest that, at the generic level, ***'yens*** would not be a residual taxon, but would simply be a residue of unnamed forms (Taylor 1990: 64-65), with the possible exception of the use of the term to designate lettuce.

Reviewing the Gitksan terms on Table 1, Gitksan Generics, there are 85 clearly distinct generics. When synonyms are reviewed to see if the concept apparently named is identical, that is, if the different consultants who gave the names would likely recognize the named entities as the same, five more distinct generics can be counted, for a total of ninety. Two forms may be subgeneric categories, (***gadimis***, the black fruited form of the black huckleberry, which is contrasted with ***simmaa'y*** proper, the large, succulent, dark bronze fruited form), and ***'waasan/'waasen***, which appears to represent either the total category 'willow', or the non-prototypical upland forms), and several forms appear to describe ecological variants which might also be subgeneric categories (***hlguugan***, timberline mountain hemlock; ***habaasxum t'ax*** 'lake grass,' cattail, sedge and bullrush; and ***umhlxum miinhl gan*** and ***umhlxum 'yip***, 'moss under trees' and 'moss on soil,' respectively). Of these 90 types (excluding the subgeneric and ecological types), 84 represent vascular plants and 6 represent mosses, fungi and lichens. This is not an exhaustive list of Gitksan floral terms; a few terms have been omitted from the potential list

because their referents were not identified, and the terms were from secondary sources. Neither have I included terms elicited by Smith in the 1920s in my tally unless I have obtained modern confirmation of their referents.

The fuzzy boundaries of the poorly differentiated less salient taxa makes exact determination of the proportion of the flora named difficult. If the more difficult and less salient fungi and mosses are eliminated, it becomes somewhat more manageable to compare the boundaries of indigenous taxa with those of botanical taxa and to arrive at a rough proportion of the total vascular flora named. However, general "catchall" terms like ***majagalee*** 'flower' and ***habasxw*** 'grass' or 'hay' still make closure difficult. Excluding these problematic terms, the 87 Gitksan vascular plant generics designate in total at least 103 different botanical species. As with the neighbouring Witsuwit'en (Johnson-Gottesfeld and Hargus 1998), this accounts for only about 10% of the vascular plant species occurring in Gitksan territory.[22] The majority of these generics correspond with single biological species, but some forms encompass two or more distantly related species, as discussed previously. For woody species, different members of the same botanical genus present in the local flora are usually classified as distinct Gitksan generics. Many herbaceous plants are not differentiated, but are unnamed or subsumed in broad categories such as the mentioned two above, 'flower' and 'grass' or 'hay.'

A final area of difficulty is the degree of uniformity of cultural knowledge of plants; clearly, in all societies, some people know more about a given area of cultural knowledge than others. For most of the names recorded in Table 1, at least two consultants confirmed the validity and referent of the term; usually this was two living consultants, but in a few cases, living elders confirmed or offered terms recorded by Smith in 1925-26. In a minority of instances, only one consultant provided the name. In these instances, a few especially knowledgable people knew the names and uses of plants no longer remembered by others. These elders were recognized in the community as the people to consult about unusual or difficult plants or terms. Sixteen terms given in Table 1 were provided by these elders.[23] Where one is dealing with a small speech community and memory ethnography, the possibility of idiosyncratic terms or referents cannot be ruled out, but I have chosen to accept them as valid names and count them as part of the Gitksan botanical lexicon.

NAMING

Gitksan plant names fall into several groups. Some names are simple, unanalysable lexemes such as ***seeks*** 'spruce,' which signify only the plant in question and have no other meaning in the language. Other names may be descriptive, indicate utility, be metaphoric, or refer to animals or to legend. Plant names may also refer to other plant species in coordinate fashion. Also, some names are evidently borrowed from other languages. Two names of important economic plants, ***ax*** (spiny woodfern) and ***gahldaats*** (yellow pondlily), have an Athapaskan origin (Gottesfeld 1993). A third term, ***ts'ex***, (designating a form of juniper/ krumholz conifer growth) is shared with Witsuwit'en and Sekani (Johnson-Gottesfeld and Hargus 1998).

Plant names may reflect utility, such as ***am'mel***, 'good for canoe,' the name for

black cottonwood. One of the two alder classes, ***amluux***, means 'good for neckring' and refers to the red dye which can be made from alder bark, which was used to dye cedarbark red for ceremonial items such as Secret Society neckrings. The bark of the other named alder category, ***giist***, cannot be used for red dye. One of the names of western red cedar, ***amh'a'tal***, means 'good for cedar bark', one of the main uses of the cedar tree. The name for western yew, *Taxus brevifolia*, is ***haxwdakw*** 'bow plant,'[24] because of its dense, hard, springy wood, ideally suited to bow construction. Sometimes a sapling sized Rocky mountain juniper, *Juniperus scopulorum*, is also called ***sganhaxwdakw*** 'bow plant,' because it too was utilized for bow construction. Perhaps allied in concept to utility are the names of the junipers, 'boughs of the supernatural,' or 'supernatural plant.' Juniper can be used for smudges, as well as having other medicinal uses.

Descriptive plant names may indicate form or colour. ***Maa'y hagwilhuxw*** 'rope-berry' is the term for strawberry bramble, *Rubus pedatus*, a trailing vine with small tart fruit. ***Maa'ya gaak*** 'crow berry' is the word for black twinberry, which has inedible glossy purple-black fruit. ***Gesgsan*** 'tree-hair' and ***ligimtxgan*** 'tree-fur,' referring to black hairlike arboreal lichens, are also clearly named descriptively. The name for soapberry, ***is***, means 'urine,' and refers to the foam which develops as the soapberry whip ***yal'is*** is prepared, which resembles that which develops when a person urinates on the ground. One of the names for birch fungus, ***mihlxw***, refers particularly to the appearance of cinder conk, *Inonotus obliquus*, and means 'charred.' The term for the rootstock of *Veratrum viride*, ***malgwasxw***, means 'something burnt.' I am uncertain if this refers to the dark colour of the dried rhizome, or to the fact that the rhizomes are commonly burned for purification.

Inedible berries may be named by reference to animals, as in in 'crowberry' above, and the various fruits grouped as 'bear's berries' (***maa'ytwhl smex***).[25] Names of inedible or unused plants may also be metaphoric or refer to legends. *Clintonia uniflora*, Queen's cup, an understory lily which has a single inedible blue berry, has been called by three different names: ***hoobixs 'wiigat*** 'Wiget's spoon,' a reference to a story in which the legendary trickster/creator figure uses the spatulate leaves as a spoon; ***maa'yhl litsxw*** 'blue grouse's berry'; and ***maaya smex*** 'bear's berry.' The inedible and unusual appearing white-fruited snowberry is called ***sgantya'ytxw*** (E), which means 'thunder plant,' or ***maa'ya luulak'*** (W) 'ghost berry.' The names for mushroom, 'bird hat' or 'penis' (***gayda ts'uuts'***) and puffball (***masxwa luulak'*** 'ghost fart') are metaphoric descriptions. The picturesque name for the nodding onion is ***ts'anksa gaak***, translates as 'raven's underarm-odour' (People of Ksan 1980). The name of the lichen species known in English as lungwort (*Lobaria pulmonaria* and *L. linita*) is ***gwilalh ganaaw***, 'frog blankets,' conveying the similarity in texture and appearance of the hydrated lichen thallus to the back of a frog or toad. This species was used medicinally. Two large herbs, *Angelica genuflexa* and *Delphinium Brownii* [sic] are reported in Smith (1926) to be named 'frog parsnip.' These are plants which in some wise resemble the important edible and medicinal herb cow parsnip or 'wild rhubarb' (***ha'mook***), but are smaller and not edible. In some sense, this is a type of coordinate naming (see below), naming by reference to another plant, as well as indicating lack of edibility by reference to an animal. However, the cloudberry *Rubus chamaemorus* (People of Ksan 1980), and/or possibly the dewberry, *Rubus pubescens* (Smith 1926) and strawberry

TABLE 6.– Coordinate Names

Gitksan term	English meaning	Scientific Names	Gitksan name	English Name	Scientific Name
hissgant'imi'yt	wintergreens or false box	*Pyrola, Orthilia* and *Chimaphila* spp.; *Pachystima myrsinites*	**t'imi'yt**	kinnikinnik	*Arctostaphylos uva-ursi*
hisgahldaatsxw	wild calla or water arum	*Calla palustris*	**gahldaats**	yellow pond lily	*Nuphar polysepalum*
hisha'mookxwit	Northern rein orchid	*Platanthera hyperborea*	**ha'mook**	cow parsnip	*Heracleum lanatum*
hisdemktxwt	licorice root fern	*Polypodium glycyrrhiza*	**demkt**	inedible fern rhizome	*Athyrium felix femina*, small *Dryopteris*, etc.
hismaawintxw	horsetails & scouring rushes	*Equisetum arvense, E. variegatum, E. hyemale,* and *E. sylvaticum*	**maawin**	common scouring rush, meadow horsetail	*Equisetum pratense* and *E. hiemale*
hisgamaawin	northern scouring rush & common horsetail	*Equisetum variegatum* and *E. arvense*	**maawin**	common scouring rush, meadow horsetail	*Equisetum pratense* and *E. hiemale*
his'waasantxwit	unknown	unknown	**'waasan**	willow	*Salix* spp.
hissgank'ots	small Solomon's seal plant	*Smilacina trifoliata*[1]	**k'ots**	false Solomon's seal	*Smilacina racemosa*
from Smith (1926):					
hisleekxwit	sweet cicely & goat's beard	*Osmorrhiza* sp. and (probably) *Aruncus sylvester*	**leek**	spreading dogbane	*Apocynum androsimaefolium*
hisk'aawtsit	heal all	*Prunella vulgaris*	**k'aawts**	lupine	*Lupinus arcticus*
hissgant'imi'yt	false box	*Pachystima myrsinites*	**t'imi'yt**	kinnikinnik	*Arctostaphylos uva-ursi*
hisnisko'otxwit	white geranium	*Geranium richardsonii*	**nisko'o**	thimbleberry	*Rubus parviflorus*
hishaawakxwit	yellow mountain avens	*Dryas drummondii*	**haawak**	birch	*Betula papyrifera*
hishaastxwit	agrimony	*Agrimonia gyrosepala*	**haast**	fireweed	*Epilobium angustifolium*
hishabasxwit	harebell	*Campanula rotundifolia*	**habasxw**	grass or hay	Gramineae, Cyperaceae etc.
hishinakxwit	one-flowered rein orchid	*Habenaria obtusata*	**hinak**	skunk cabbage	*Lysichiton americanum*
hissgank'ots	star flowered Solomon's seal	*Smilacina stellata*	**k'ots**	false Solomon's seal	*Smilacina racemosa*
hismaawintxw	"branched horsetail rush"	*Equisetum arvense* ?	**maawin**	"horsetail rush"	*Equisetum hyemale* (?)
hisganthoot[2]	hardhack, spiraea	*Spiraea douglasii* var. *menziesii*	**?**	unknown	

[1] This identification was made by Art Mathews from a photograph in Plants of Northern British Columbia and appears in Mathews n.d.
[2] This spelling has not been changed to modern orthography as I am not certain of the word.

bramble, *Rubus pedatus*, which have been called ***'miiganaa'w*** (frogberry), may be an exception to this generalization. None of these types of berry is large or abundant, and the cloudberry grows in wetlands, which might be metaphorically associated with frogs, but they are edible and palatable berries.

Names may also be given in reference to other plants, as in the common practice of calling something ***his***___ 'resembling ___,' as in ***hissgant'imi'yt*** 'resembling kinnikinnick.' Table 6 shows five such present day names and ten collected by Smith in the 1920s. Three of Smith's terms are the same as terms collected in the 1980s and 1990s. I have interpreted these terms as coordinate (Hunn and French 1984), or as peripheral members of a loose grouping named in reference to a specific prototype, usually a plant which is either more salient or of higher utility. Some descriptive terms or 'resembling' names may be more spontaneous inventions and may not be stable names.[26] The temporal stability of such terms, or their use by consultants from different families or villages can serve as indications these terms can be taken as names.

Lending credence to the reality of ***his***___ names is the fact that not all plants are instantly dubbed with such terms; some plants are said to have no name. Often these are plants which have not been noticed by the consultant prior to questioning, although they certainly occur in the region. Table 7 lists 13 plant species presented to Gitksan consultants which were not named. Harlan Smith (n.d.) reports a number of plants, usually small herbaceous forms, which were said to

TABLE 7.– Plants Unnamed in Gitksan

English Name	Scientific Name	Consultant
alpine willow	*Salix arcticus* ssp. *crassujulis*	OR
rattlesnake plantain	*Goodyera oblongifolia*	OR, DG
northern bedstraw	*Galium boreale*	OR
sweet cicely	*Osmorhiza* sp.	OR, DG
heartleaved twayblade	*Listera cordata*	OR
river beauty	*Epilobium latifolium*	OR
wild mint[1]	*Mentha arvensis*	OR, DG?, PM
alpine clubmoss	*Lycopodium* cf. *sitchense*	DG
fir clubmoss[2]	*Huperzia selago*	DG
one-sided wintergreen	*Orthilia secunda*	DG
green wintergreen	*Pyrola chlorantha*	OR
Prince's pine[3]	*Chimaphila umbellata*	OR
oak fern	*Gymnocarpium dryopteris*	OR

[1] DG's first reaction was to begin talking about **isxumsgan'isxw**, 'smelly plant'? *Valeriana sitchensis*. He seemed confused when I sad the specimen was mint.

[2] Fir clubmoss was lumped with moss by OR, and likened to **<u>x</u>aada<u>x</u>** by DG, who did not give it a name.

[3] This was called **hissgant'imi'yt** by DG.

TABLE 8.–Plants Said to Have No Name by Harlan Smith's Consultants, 1925-1926 (Smith 1926)

English Name	Latin Name
northern bedstraw	*Galium boreale*
twinflower	*Linnea borealis*
aster	*Aster junceus* Ait.*
daisy fleabane	*Erigeron philadelphicus*
goldenrod	*Solidago canadensis* var. *subserrata*
arnica	*Arnica cordifolia*
ragwort	*Senecio cymbalarioides*
ragwort	*Senecio balsamitae* Muhl.*
rosy pussy toes	*Antennaria rosea*
wooly thistle	*Cirsium (Carduus) undulatum* (Nutt.) Spreng *
hawksbeard	*Crepis elegans*
yellow rattle	*Rhinanthus crista-galli*
penstemon, turtlehead	*Nothochelone nemorosa*
blue-eyed mary	*Collinisia parviflora*
blue-bells	*Mertensia paniculata*
gilia	*Gilia liniaris*
gilia	*Gilia gracilis*
showy Jacob's ladder	*Polemonium pulcherrimum*
buckbean, bogbean	*Menyanthes trifoliata*
pacific starflower	*Trientalis arctica* *
Indian Pipe	*Monotropa uniflora*
pink wintergreen	*Pyrola asarifolia*
Prince's pine	*Chimaphila umbellata*
silverweed	*Potentilla viridescens* Rydb. *
saxifrage	*Saxifraga tricuspidata* (probably *S. bronchialis*)
grass-of-parnassus	*Parnassia fimbriata*
marsh grass-of-parnassus	*Parnassia palustris*
ball mustard	*Neslia paniculata* (L.) Desv. *
draba	*Draba lutea* Gilib. *
rock cress	*Arabis hirsuta* (L.) Scopt. *
wormseed mustard	*Erysium cheiranthoides* L. *
creeping buttercup	*Ranunculus repens* L.
violet	*Viola canadensis*
violet	*Viola adunca*
northern geranium	*Geranium erianthum*
alpine milk vetch	*Astragalus alpinus*
field crazy weed	*Oxytropis monticola* *
birdfoot clover	*Hosackia denticulata* *

* Scientific names may be obsolete or misapplied

have no name (Table 8). Other plants are recognized by the consultant, but he or she cannot remember what it is called. These are considered to have names, although in some cases the name can no longer be recorded because no one recalls what it is.[27]

Subtypes of moss are called by their place of growth, as ***umhlw minhl gan*** 'moss beneath the trees' or ***umhlxum yip*** 'moss-on-soil,' differentiated from the prototypical ***umhlw*** which grows in swamps. A subtype of 'grass' (***habasxum t'ax***) is also named by habitat: it is 'lake grass.' I am not certain if these constitute true names or are simply spontaneous coinages, although the term ***habasxum t'ax*** for cattails was given by two different consultants.

Not included in Table 1 or subsequent tables are a handful of terms of recent origin which refer to cultivated plants. After the penetration of their territories by traders and missionaries, the Gitksan learned about and learned to cultivate common garden vegetables such as carrots, potatos, turnips, cabbages, and rhubarb. The terms for these new plants are almost all borrowed from European languages, usually English, sometimes through Chinook jargon, the regional trade argot of the nineteenth and early twentieth centuries. These forms include ***k'awts*** (carrots), ***sgusiit*** (potatos, from 'good seed'), ***selali*** (celery), ***sganapils*** (apple tree), ***maaxwsxwa k'awts*** (parsnip, 'white carrot'), and ***kaabits*** (cabbage). The derivation of ***k'inuu***, turnips, is not obvious, and lettuce is simply called ***'yens*** 'leaves.'[28]

In contrast to other groups such as the Sahaptin (Hunn and French 1984) or the Tobelo (Taylor 1990:22), the Gitksan do not seem very concerned with whether a designation is a true name or just something a thing is called.[29] A core of terms are very stable, exhibiting little temporal or geographic variation. Another grouping exhibits only the generalized phonological variation between eastern and western dialects (indicated on Table 1 by (E) and (W)). Other terms are more variable. Generally these refer to smaller, herbaceous plants which may be little or unutilized, though perhaps common or widespread, such as Queen's cup, discussed above, for which three distinct names were collected in the course of my fieldwork; one of the three terms, ***hoobixs 'Wiiget*** (W), was in use seventy years ago in Gitwingax when Harlan Smith did his field work.

RELATIONSHIP OF PLANT GROUPINGS TO UTILITY AND PLANT PATRONS

The Gitksan have several terms which describe the parts of plants. These are listed in Table 9. Trees have wood (***gan***) and bark (***maas***). Coniferous trees, and the shrubby juniper species, have boughs/needles designated by ***laxs***. Horsetails and clubmosses have small simple needle like or rather obscure leaves, which can be called ***laxs*** like conifer needles. In contrast, herbaceous plants and deciduous trees and shrubs have leaves, ***'yens*** (W)/***'yans*** (E). Conifers have hard dry cones, ***meek***; one deciduous tree genus, *Alnus*, also has woody catkins that are called ***meek***. Fleshy fruits of angiosperms are called 'berry.'[30] Ferns, horsetails, and clubmosses lack both ***maa'y*** and ***meek***.[31]

Plants in general, both herbaceous and woody, have roots, ***wis***. Plants also have a plant body, designated at least for intermediate sized to small perennial plants by ***sgan***. This term seems to connote stem or supporting structure (Compton

TABLE 9.– Plant Organs or 'Partons' and Associated Plant Groups

Gitksan term	English meaning	Associated Plant Groups
gan	wood	**gan**, 'trees'
gult	dry conifer needles	coniferous trees
hlagant	stem	**sgan**, 'plants'
laxs	conifer bough or needles	coniferous trees; clubmosses and horsetails
maas	bark	**gan**, 'trees'; **sgan**, 'plants' (part)
maa'y	berry or fruit	**maa'y**, 'berries'; **sgan**, 'plants' (part)
majagalee	flower	**majagalee**, 'flowers'; **sgan**, 'plants' (part)
meek	cone	coniferous trees (and alder)
sgan	pitch	coniferous trees
wiis	root	**gan**, 'trees'; **C**; ?**majagalee**, 'flowers'
'yens (W)/**'yans** (E)	leaf	**gan**, 'trees' (part); **gan**, 'trees'; **'yens**, 'leaves'
hla'ushl 'waasen	willow catkin	willows
binaakt	thorns	some **sgan**, 'plants'
siiswgit	thorns	some **sgan**, 'plants'

et al. 1997), though by extension, it includes the entire plant. There is also a word which specifies stem, ***hlagandit***. Grasses, in contrast, lack large fleshy or woody roots, and lack (in general) obvious erect stems or broad, discrete leaves. The below-ground part of grasses may be referred to as ***miinyip*** or ***miinhabasxw*** 'under ground' or 'under grass.' Mosses contrast with other plants in lacking evident roots and stems, and in having extremely small and simple leaves.

Plants, particularly angiospermous shrubs and herbs, may also possess flowers, ***majagalee***. This term both signifies the plant organ (as a rose flower), and serves as a catchall term for plants which are not perceptually salient except for their flowers. Flower here is intended in the folk sense of a relatively large, brightly coloured, often scented, reproductive organ or infloresence, and does not include the infloresences of grasses or sedges, nor the catkins of trees and shrubs in the Salicaceae and Betulaceae. The catkins of willows can be called ***hla ushl 'waasen*** (Mathews n.d.)

These terms define fundamental aspects of plant appearance and properties; by extension, presence or absence of parts influences the potential utility of plants. Trees, ***gan***, are defined by wood (***gan***), a polysemous situation reported for the Montagnais (Clément 1995) and many other groups (Brown 1984, 1991). The utility of wood, for technology, construction and, important in a northern latitude, fuel, is significant, and pervasive. Trees also have ***maas*** 'bark' and ***wis*** 'large woody roots,' which are used both for medicine and technology. A class of medicines whose main ingredients are barks of trees and large shrubs is ***haldowkumgan***, translated as 'wood medicine.' The edible inner bark ***k'anix*** of several tree species was important for food. In addition, trees form the predominant vegetative cover, aggregated as forest.

The loose "plant" grouping, in contrast, is not tidily defined by partons. Plants do have a plant body, cf. 'stem' (***sgan***). This varies from woody perenniel stems with well developed and usable bark (e.g. *Sambucus racemosa*) to weak and thin perennial or biennial stems and leaves (e.g. the various species of *Rubus*), to the

prostrate stems and leaves of evergreen subshrubs (e.g., kinnikinnick, *Arctostaphylos uva-ursi*), or simply petioles and leaves and runners of perennial herbs such as bunchberry, *Cornus canadensis*. They also possess leaves, ***'yens***, usually relatively large, and often possess fleshy edible (or sometimes inedible) fruits, ***maa'y***. Both trees and "plants" have roots, ***wis***, which may be useful for technology or medicine. I am uncertain if rhizomes such as those of the yellow pond lily are called ***wis*** along with true roots.[32]

The "berry" grouping, which is obviously defined by possession of (edible) fleshy fruits, "berries" (***maa'y***), overlaps substantially with the "plant" grouping. Berries are seen as a key identifying character of plants which are not trees; edibility or inedibility of the berries is of high cultural significance, given the paucity of other types of carbohydrate foods. Inedible "berry" types may be marginal to the grouping, and be more properly considered as "plants" (***sgan***).

The residual groupings of herbaceous plants, ***'yens*** and ***majagalee*** are obviously defined by characteristic partons: prominent leaves with no woody stem, and conspicuous flowers, also without woody stem. They also seem to be defined by disutility.[33]

More problematic is the graminoid ***habasxw*** group. The term ***habasxw*** also means 'covering' (Rigsby, personal communication 1996).[34] Rigsby feels the term carries more the sense of the graminoid growth form than of a specific plant structure. The group ***umhlw*** is similar in that the group is simply called "moss," which is not a term for a part of a plant, but a type of plant or growth form.

Fungi in some sense resemble "leaves" and "flowers" in being a residual grouping, but the plant parton in this case is essentially the entire visible structure, which is the fungal fruiting body, either a fleshy mushroom or a woody bracket fungus or "conk." The group name ***gaydats'uuts'*** is a metaphoric descriptive term for a typical mushroom.

SUMMARY AND CONCLUSIONS

Gitksan plant classification differs from scientific taxonomy in being of shallow hierarchy, in having overlapping and at least partially utilitarian major plant groupings or "life forms", and in lack of focus on reproductive parts of plants to indicate true relationships. It is similar to other indigenous classification schemes documented for northwestern and northern North America. As in other documented ethnobotanical taxonomies in this region, vines are not a life form, where berry/fruit plants, mosses, and fungi are recognized life forms (e.g. Compton 1993; Gottesfeld 1993; Johnson-Gottesfeld and Hargus 1998; Turner 1974, 1987, 1989; Turner et al. 1990). In common with many other folk taxonomies, small and perceptually less salient forms such as mosses, fungi, lichens, and graminoid plants are underdifferentiated in comparison to Western scientific taxonomy (Atran 1985: 300; Berlin 1992: 25, 60-61). This results in so called "empty life forms", which are taxonomically diverse groups (in scientific classification) of ecological importance and distinctive habit, but which contain few or no named subdivisions in the indigenous taxonomy (Turner 1974). As Brown (1985) found in the classification systems of other foraging cultures, binomial terms and subgeneric taxa are very weakly developed in Gitksan plant classification.

The Gitksan classification system is not a unified abstract whole, but a mixture of partial classifications built for different purposes and using diverse criteria, prominently including utility. Morphology, as in all ethnobiological classification systems, is a fundamental basis of classification. Utility, as Clément (1995) has pointed out, bears a relationship to plant partons, which create morphological differences between plant types that make them suitable for different uses. Morphology and utility are thus intertwined. Symbolic and ecological characters clearly also have a role in Gitksan plant classification.

Naming among the Gitksan includes the use of animal terms and mythological references to indicate disutility or inedibility. The naming of plants by reference to other plants, usually with the term ***his-***, stands out, and recalls coordinate naming by the Sahaptin (Hunn and French 1984) and Wet'suwet'en (Gottesfeld 1993 and Johnson-Gottesfeld and Hargus 1998). Some names are also directly utilitarian ('good for canoe,' 'wiping plant'). Unlike some groups, the Gitksan do not seem overly concerned with true names; more to the point is "what they call it." Many plants, especially herbaceous and weedy forms, are unnamed, and others are referred to in very broad "catch-all" categories. The few terms for cultivated plants (as one might anticipate), are apparent European borrowings. Binomial names in the classic sense, are extremely rare.

I would like to close with a brief consideration of emic views of classification. In the course of 1996 field work, two Gitksan speakers I worked with expressed discomfort with the whole orientation of this project. One consultant commented that it was difficult to render the meaning of the term ***sgan*** in English, that English terms like tree and shrub didn't really have the same connotation. She then tried to express how this term for her encompassed many aspects of the relationship of plants to the cycle of the year, to the bearing of fruit.

The second consultant expressed dissatisfaction with the way that English always wanted to divide things into boxes. She commented, "Why do outside people have to put things in boxes–the way we think there's a time for all these [plants] and they're all linked together. These little plants have a purpose, to help the other ones grow" (S. Howard notes 9/14/96.) For her, the appropriate way to look at plants was to see them in relationship. She said:

> Life cycle-the cycle continues. Plants start growing, leaves open. Trees first. It feeds the animals. The cycle continues. Then salmon comes. In the fall are the animals. That's how the life cycle continues. There's a certain time for something which helps sustain the life of another being, and that's where the chain link comes in. You have to preserve the link. If you ever destroy that link, then the rest is destroyed (S. Howard 9/14/96.)

NOTES

[1] Names and/or scientific identifications were sought for all species mentioned by people or noted by people in the course of field trips, and for some species I collected in the course of fieldwork which I had no previous indication were named or used, such as several species of wild orchids, sedge, and grasses. The extent of some classes was probed by bringing several related botanical species to experts for naming, as, for example the various species of *Equisetum*. In addition, fieldwork in 1996 was directed at clarifying some questions regarding classification which had arisen in the course of preliminary analysis of Gitksan plant classification.

[2] Gitksan words in this article are spelled in the practical orthography used by the Gitksan dictionary committee. There are two dialects, the upstream or eastern dialect, and the downstream or western dialect, which differ somewhat in spelling. Where both spellings are given for a single work, I have indicated dialect with E or W. The spelling of "Gitksan" actually differs between the dialects, being best rendered Gitxsan for the eastern dialect, and Gitksen for the western. Therefore, I have retained the standard spelling "Gitksan" for the people and language in this work.

In the Gitksan orthography, underlined stops and fricatives indicate velar sounds as opposed to palatal sounds. /g/ (voiced stop) /k/ (voiceless stop) and /x/ (fricative) can exist as both velar and palatal variants. ***Hl*** indicates a lateral fricative. Glottalized consonants (m, w, y) are written with ', as ***'m***, ***'y*** or ***'w***. Glottal stops are indicated with '. Ejectives are written with the ' after the consonant or digraph, as in ***ts'ilasxw***. Spellings have been checked by Bruce Rigsby, University of Queensland, and Art Mathews Jr. of the Gitksan Dictionary Committee. Any errors that remain are my own.

[3] One anonymous reviewer points out, however, that coral root *Corallorhiza* spp., and Indian pipe *Monotropa uniflora* and similar saprophytic vascular plants do have somewhat similar appearance and ecology to macrofungi.

[4] Modern classification schemata often include five Kingdoms: Plantae, Animalia, Fungi, Protista (unicellular eucaryotic organisms) and Monera (procaryotic organisms including blue green algae and various groups of bacteria) (cf. Curtis 1983: 385; Barrett et al. 1986: 1069-1074).

[5] "Berry" is used here in the popular sense of small fruits. Morphologically, the fruits utilized by the Gitksan include drupes, pomes, berries, and aggregate fruit, as well as one aberrant example of a spheroidal coloured fleshy leaf.

[6] A complete listing of Gitksan, English, and scientific names, with authorities, is given in Table 1.

[7] Art Mathews Jr. mentioned the name ***gaanaxws*** of the moss or liverwort and related it to a locality called ***Wilp Gaanaxws*** on his traditional territory which was named after it because it is abundant in that area. He offered an identification as a leafy liverwort based on an illustration in Plants of Northern British Columbia (MacKinnon et al. 1992) and also thought it resembled a picture of a *Dicranum* with falcate secund leaves.

[8] Interestingly, the type pointed out to me by this name, *Lycoperdon* sp., bears a Latin name which also alludes to an uncanny character and metaphoric farting; the generic name translates as 'wolf fart.' The smokelike puff of spores that ejects out of a pore in the top of a ripe fruiting body when squeezed or stepped on is th 'fart' described in the names.

[9] In 1996, Art Mathews indicated that dandelion was called ***ba<u>x</u>bo<u>k</u>'*** in the Eastern dialect area, although the Western dialect apparently lacks a name for it. Smith's consultant was from Gitwinga<u>x</u> in the Western dialect area.

[10] "***Huwehl gangan, 'yens ganhl majagalee***"(western dialect), Gitxsenim<u>x</u> - Gitxsanima<u>x</u> to English Dictionary, Learner's Edition, Volume 1 by the Aboriginal Education Branch, British Columbia Ministry of Education, Gitksan Wet'suwet'en Education Society School District #88, Sim'algyax Working Group, n.d.

[11] The plants I specifically asked about were yellow pondlily, riceroot lily, cow parsnip, Queen's cup, devil's club, yarrow/everlasting, red osier dogwood, water arum, Sitka valerian, moss, grass/hay, and stonecrop. Art Mathews Jr. added fireweed to the list, and suggested one only says ***sgan haast*** when it is necessary to clarify that one is referring to a plant (floral form) rather than a dog (animal) when speaking to Coast Tsimshian people. Dog ***aas***, is similar to fireweed ***haast*** in Coast Tsimshian, where they are unambiguous about Gitksen.

[12] This similarity is also recognized in England, where 'osier' means willow; both shoots of true willow and the red osier are used for willow basketry (wickerwork).

[13] The name means 'covers to the hips/groin' and presumably indicates the general stature of the plant.

[14] Several other lichen names given in Art Mathews n.d. probably belong in this intermediate. I have not included these groups in the present paper because the extension and identity of their referrants have not been checked, nor have field specimens been obtained for technical determination. Mathews lists ***ges 'wiiget*** as *Bryoria lanestris*, ***hla'yimk<u>h</u>l gan*** as *Alectoria sarmentosa* and ***hla'anisihl sginist*** as *Usnea lapponica*. He based his identifications on pictures in Plants of Northern British Columbia (MacKinnon et al. 1992).

[15] The term ***gadimis*** is a possible exception; it is a term denoting a less preferred form of the black huckleberry, *Vaccinium membranaceum*. The name is not related linguistically to ***simmaa'y***, 'real berry,' which applies to the species in general, and to the preferred large, dark bronze fruited form. The difficulty is deciding if the term is best considered a second generic, or whether it is a specific or some other type of subdivision (see discussion of growth phases and sex phases of animals in Clément 1995). An exception which overgeneralizes is the typical inclusion of both *Picea* x Roche and *Picea mariana* in ***seek<u>s</u>***, though recognition of different species of spruce in the Skeena Valley, where at least *Picea sitchensis*, *P. engelmanni*, and *P. glauca* hybridize and intergrade, is arbitrary at best.

[16] "As there are two plants called by this name, this one [*Castilleja miniata*] is called short, the other...[*Aquilegia formosa*] tall" (Smith 1926: 181). Smith (1986) reports two medicinal uses for *Castilleja*: a decoction of the whole plant for "nose bleed, bleeding, stiff lungs, bad eyes, and lame back, possibly caused by kidney trouble," and a decoction used for cough.

[17] The smaller species *S. stellata* was named in coordination to *S. racemosa* by Smith's informant in 1926 (see Table 6) and was called ***hissgank'ots***.

[18] However, ***amk'ooxst*** means "aspen," while ***k'ooxst*** means "maple." Another exception is ***am'mel***, which means "cottonwood," but ***'mel*** means 'canoe.'

[19] A related problem occurs when different consultants, speaking different dialects, give the same term for two unrelated botanical species. This occured with the use of ***sgantya'utxw***(E)/***sgantye'txw***(W) for snowbwerry, *Symphoricarpus albus*, and fool's huckleberry, *Menziesia ferruginea*. Possibly the name 'thunder plant' is a "catchall" term uniting several shrubs which have no edible berries.

[20] Although it is tempting to think that the names may correlate with the two botanical species, most of the time people are thinking only of *Juniperus communis*, which is far more widely distributed, and is the species I have observed being collected for medicine. The elders who first gave the two Gitksan terms and discussed their contrasting uses were from Git-anmaaxs and Gisbayakws, where there is no *Juniperus scopulorum* nearby. However, the occurrence of the ***ts'ex*** form in the unrelated Athapaskan language Witsuwit'en, where it seems to indicate conifers of scrubby or krumholz growth form (Johnson-Gottesfeld and Hargus 1998), does confuse the issue.

[21] ***'Waasen/'waasan*** apparently does ont apply to the perennial montane prostate willows, also botanically placed in the genus *Salix* (Olive Ryan interview transcript 7/25/95). Olive Ryan did not apply any name to a specimen of the prostrate alpine willow *Salix arctica* ssp. *crassujulis*, although she readily named a leafy sprig of *Salix scouleriana*, the common tree size willow of upland sites in that area.

[22] Dr. Jim Pojar of the British Columbia Forest Service gave an estimate of 900-1000 vascular plant species for the Bulkley River drainage for that work (personal communication 1997). As vascular plant diversity is similar for the adjacent Gitksan territories, a figure of 1000 vascular plant species present in the local flora is a reasonable working hypothesis.

[23] The elders were David Green, the late Olive Ryan, Pete Muldoe, the late Jeff Harris Sr., and a somewhat younger but very knowledgeable man, Art Mathews Jr. (Dinim Gyet), whose recently deceased father knew a great deal and also contributed to this project. The terms are ***gaanaxws, gadimis, gesgan, hisgahldaatsxw, hlit, isxum sgan'isxw, ligimtxgan, maa'yhl litsxw, maa'yim hagwilhuxw, maa'y welgan, maa'ya luulak'***, and the descriptive phrases ***umhlxum yip*** and ***umhlxum miinhl gan***.

[24] This name was also given by Pet Muldoe to the short tree sized juniper *Juniperus scopulorum;* he said that slender young trees were used for bow construction. The late Olive Ryan in 1996 also provided this name for a photograph of a tree sized Rocky Mountain Juniper.

[25] Gottesfeld (1993) and Johnson-Gottesfeld and Hargus (1998) discuss this phenomenon for the Wet'suwet'en and other northwest Coast groups. Compton (1993) also mentions this phenomenon.

[26] For example, Olive Ryan described false box (*Pachystima myrsinities*) as "waxberry" (***t'imi'yt***), but mentioned that the real kind has berries. Other consultants have called it ***hissgant'imi'yt***.

[27] An interesting case is presented by *Arnica cordifolia,* heart-leaved arnica, an indigenous plant which has a medicinal use, but which was simply called, in English "sunflower" and no Gitksan name was offered.

[28] These forms were provided by Art Mathews Jr., though my orthography is slightly different.

[29] Possibly Gitksan people are comfortable with multiple names of different formality applying to plants, because people, too, have various names depending on context and circumstance. Now, of course, people have legal English names which are registered with the government. Traditional Gitksan names include a series of names of different status and rank which a person may hold in the course of his or her lifetime. An adult of high status may hold more than one chiefly name and one or more ***naxnok*** names at the same time. These names are passed on separately in the lineage group. In addition, many people have nicknames by which they may be called for most of their lives; I believe this practice antedates the introduction of European Christian names and surnames, and may have leant some consistency of reference to individual people as they assumed a series of different names throughout their lives.

[30] The fruits of all local species of angiosperms are relatively small and berry-like, although botanically they include a diversity of fruit types. In addition there are, of course, various dry capsules and legumes, which do not seem to be named in ***sim'algyax***.

[31] This is reflected in the popular naturalist's term in English "ferns and fern allies" for vascular plants that produce spores, although the groups so included are diverse groups of very distant relationship and distinct morphology which are distinguishable in the Carboniferous Period of the Paleozoic and have been distinct for more than 300 million years.

[32] When asked directly if one could call the rhizome of yellow pond lily, or Indian hellebore ***wis,*** several consultants replied that they could not, and on one occasion suggested that one could use the term for these rhizomes (interview notes 1996).

[33] I am uncertain if named flowers of some utility, such as the peavines, ***hagimgasx*** 'wiping plant,' belong in this group. The use of ***'yens*** to designate lettuce might also be mentioned here.

[34] ***Habasxw*** is an antipassive nominalisation (a noun) of the verbal root /hap-/ "to cover," "covering (n.), what covers" (Rigsby, personal communication 1996-1997).

ACKNOWLEDGMENTS

I wish to acknowledge the Gitksan elders and other people who contributed to my understanding of Gitksan naming and classification of plants: especially David Green, the late Jeff Harris Sr., the late Robert Jackson Sr., Art Mathews Jr. (Dinim Gyet), the late Elsie Morrison, Pete Muldoe, the late Olive Ryan, and the late Walter Wilson. Sadie Howard, Beverley Anderson, and Joan Ryan also assisted with questions of classification in the 1996 field season. I would like to thank Beverley Anderson for continuing inspiration, and cultural interpretation. I would like to acknowledge the Gitxsan Treaty Office and its predecessors, the Office of Hereditary Chiefs and the Gitksan-Wet'suwet'en Tribal Council, for making this research possible, and for making available Smith's unpublished manuscript at the beginning of my research.

I would also like to express my gratitude to Dr. Bruce Rigsby for his help with Gitksan linguistics and orthography and unstinting suppport, and to Dr. Brian Compton for making available his doctoral dissertation. Thanks are due to Dr. Adolf Ceska and the late Dr. Robert Ogilvie of the Royal British Columbia Museum for help with plant identifications, and to Dr. Randy Currah and Dr. Dale Vitt of the Biological Sciences Department of the University of Alberta for identifications of fungi and bryophytes. Financial support for the research was provided by N.N.A.D.A.P. (funding to the Gitksan Education Society for the Traditional Medicine Project, 1987-1988), the Canadian Circumpolar Institute (field support in 1992, 1994, and 1995), and the Jacobs Foundation (field support 1996), and by a doctoral fellowship from SSHRC (1994-1997).

LITERATURE CITED

ATRAN, SCOTT. 1985. The nature of folk-botanical life forms. American Anthropologist 87:298-313.

———. 1990. Cognitive Foundations of Natural History. Cambridge University Press, Cambridge.

BARRETT, JAMES M., PETER ABRAMOFF, A. KRISHNA KUMARAN, and WILLIAM F.MILLINGTON. 1986. Biology. Prentice-Hall, Englewood Cliffs.

BERLIN, BRENT. 1992. Ethnobiological Classification, Principles of Categorization of Plants and Animals in Traditional Societies. Princeton University Press, Princeton.

BROWN, CECIL. 1984. Language and Living Things, Uniformities in Folk Classification and Naming. Rutgers University Press, New Brunswick.

———. 1985. Mode of subsistence and folk biological taxonomy. Current Anthropology 26(1):43-64.

———. 1991. On the botanical life-form "tree." Pp. 72-78 *in* Man and a Half, Essays in Pacific Anthropology and Ethnobiology in Honour of Ralph Bulmer, Andrew Pawley (editor). The Polynesian Society, Aukland.

BYE, ROBERT A. JR. 1986. Voucher specimens in ethnobiological studies and publications. Journal of Ethnobiology 6(1): 1-8.

CLÉMENT, DANIEL. 1995. Why is taxonomy utilitarian? Journal of Ethnobiology 15(1):1-44.

COMPTON, BRIAN. 1993. Upper North Wakashan and Southern Tsimshian Ethnobotany. Ph.D. Dissertation, Department of Botany, University of British Columbia, Vancouver.

———, BRUCE RIGSBY and MARIE-LUCIE TARPENT (editors). 1997. Ethnobotany of the Gitksan Indians of British Columbia by Harlan I. Smith, National Museum of Canada, Ottawa. Canadian Museum of Civilization, Hull.

CURTIS, HELENA. 1983. Biology, 4th edition. Worth Publishers, New York.

ELLEN, ROY. 1993. Cultural Relations of Classification, an Analysis of Nuaulu Animal Categories from Central Seram. Cambridge University Press, Cambridge.

GOTTESFELD, LESLIE M. JOHNSON. 1992. Short Communication: use of cinder conk (*Inonotus obliquus*) by the Gitksan of Northwestern British Columbia, Canada. Journal of Ethnobiology. 12(1):153-156.

———. 1993. Plants, Land, and People, the Ethnobotany of the Wet'suwet'en. MA Thesis, University of Alberta, Edmonton.

HITCHCOCK, C. LEO and ARTHUR CRONQUIST. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle.

HULTEN, ERIC. 1968. Flora of Alaska and Neighboring Territories, a Manual of the Vascular Plants. Stanford University Press, Stanford.

HUNN, EUGENE S. 1982. The utilitarian factor in folk biological classification. American Anthropologist 84(4): 830-847.

——— and DAVID H. FRENCH. 1984. Alternatives to taxonomic hierarchy: the Sahaptin case. Journal of Ethnobiology 4(1): 73-92.

JOHNSON-GOTTESFELD, LESLIE M. and SHARON HARGUS. 1998. Classification and nomenclature in Wet'suwet'en ethnobotany-a preliminary examination. Journal of Ethnobiology 18(1): 69-101.

———, and D. H. VITT. 1996. The selection of *Sphagnum* for diapers by indigenous North Americans. Evansia 13(3): 103-108.

MACKINNON, A., J. POJAR and R. COUPE (editors). 1992. Plants of Northern British Columbia. Lone Pine Publishing, Edmonton.

MATHEWS, ART. n.d. Plants for Review. February 1996. [manuscript in possession of author, for preparation of Gitksan Dictionary].

MORRIS, BRIAN. 1984. The pragmatics of folk classification. Journal of Ethnobiology 4(1):45-60.

PEOPLE OF KSAN. 1980. Gathering What the Great Nature Provided. Douglas and McIntyre, Vancouver and Seattle.

SMITH, HARLAN I. 1926. Ethno-botany of the Gitksan Indians of British Columbia. 2nd Copy. 1192.4A.B90 F1. Unpublished manuscript on file at the Canadian Museum of Civilization, Hull, Québec.

TALLER DE TRADICÍON ORAL and PIERRE BEAUCAGE. 1987. Catégories pratiques et taxonomie: notes sur les classifications et les pratiques botaniques des Nahuas (Sierra Norte de Puebla, Mexique). Recherches Amérindiennes au Québec 17(4): 17-35.

TAYLOR, PAUL MICHAEL. 1990. The Folk Biology of the Tobelo People, a Study in Folk Classification. Smithsonian Contributions to Anthropology No. 34. Smithsonian Institution Press, Washington, D.C.

TURNER, NANCY J. 1974. Plant taxonomic systems and ethnobotany of three contemporary Indian groups of the Pacific Northwest (Haida, Bella Coola, and Lillooet). Syesis 7 (Supplement No. 1): 1-104.

———. 1987. General plant categories in Thompson and Lillooet, two Interior Salish languages of British Columbia. Journal of Ethnobiology 7(1):55-82.

———. 1989. "All berries have relations" mid-range folk plant groupings in Thompson and Lillooet Interior Salish. Journal of Ethnobiology 9(1): 69-110.

———, LAURENCE C. THOMPSON, M. TERRY THOMPSON, and ANNIE Z. YORK. 1990. Thompson Ethnobotany, Knowledge and Usage of Plants by the Thompson Indians of British Columbia. Memoir No. 3, Royal British Columbia Museum. Royal British Columbia Museum, Victoria.

Las Plantas de la Milpa entre los Maya. Silvia Terán, Christian Rasmussen, and Olivio May Cauich. Mérida: Fundación Tun Ben Kin, Calle 15-B No. 90, Col. Chuburná, CP 97200, Mérida, Yucatán, México. Pp. 278, including many color plates; 14 further unnumbered pp. of color plates following p. 278. Bibliography; no index. ISBN 970-92060-0-1.

This superb study presents exhaustive detail about the commoner plants cultivated by the Yucatec Maya farmers of Xocen, a large and extremely tradition-conscious farming community in the remote eastern forests of Yucatán state. The book brings together virtually all the practical knowledge, medicinal lore, and religious belief that the farmers of Xocen could relate to the investigators. An earlier companion volume, Terán and Rasmussen's *La milpa de los Mayas* (1994), provided the relevant biological, pedological and agronomic data, as well as much detail on local fauna and flora. These two books, between them, give by far the best and most comprehensive picture available of agriculture in the lowlands of southeast Mexico. As such, they are indispensable for archaeologists working in the Maya area, as well as for ethnobotanists interested in traditional tropical agriculture.

Las plantas de la milpa entre los Mayas includes data on planting, irrigation, pests and pest control, and uses, including food, medicine, forage, and magic. It also provides long texts, taken down directly from Maya farmers' narration and translated into Spanish, about the plants in question. It also contains a long and powerful prayer, delivered by the ceremonial leader at a first-fruits rite in a milpa. This oration, given in Maya and in Spanish translation, is one of the longest, richest, and most religiously interesting Maya ceremonial texts ever published, and would well repay serious study. It contains some ethnozoological interest; the eagle-hawks and hawks are called in to control the jays and blackbirds that would eat the maize. Maize is significantly referred to as *gracia*, a Spanish word used in Maya for divinities and divine matters. (It is worth mentioning that the Maya epithet for Jesus, *kichkelem yum* ["handsome lord"], is apparently a term formerly used for the Maize God.) Another valuable inclusion is a collection of traditional foods, as described by their makers. Christian Rasmussen's color photographs are not only excellent; they are also particularly well chosen for their scientific value.

With this book, Xocen becomes one of the most thoroughly ethnobotanized communities in the world, ranking with Chamula and Tenejapa in Chiapas. In addition to the work of the Terán-Rasmussen group, we have the superb study of forage and animal feeds by Elena Acosta Bustillos (Acosta Bustillos et al. 1998), and Herrera's truly magistral study of gardens and orchards in the nearby daughter community of Xuilub (Herrera Castro 1994). There is also substantial work by Bruce Love on religion, largely—alas—unpublished. However, from nearby Becanchen, Love brings us a description of a field ceremony with Maya oration text, that is closely comparable to the one in the book under review (Love and Peraza 1984). Xocen regards itself as the center of the world, and perhaps it is, at least as far as lowland tropical ethnobotany is concerned.

However, Xocen has also lost its sacred book. According to local tradition, somebody (accounts differ) borrowed the book and never returned it. This too

may be all too prophetic of the future, for the books written about Xocen are difficult to find. Like so many studies of south Mexican life and ecology, the book under review was published in a small edition and distributed locally. The "Fundación Tun Ben Kin" is a two-person operation; Terán and Rasmussen are an independent ethnographic team, their work supported largely by the Danish aid organization Danida. Olivio May Cauich, their collaborator, is a Xocen Maya. The book can be obtained only by writing the authors or emailing them at chrasmus@prodigy.net.mx. The companion volume was also self-published, and is more or less exhausted. An earlier, and invaluable, collection of texts from Xocen was mimeographed, and distributed (with governmental help) to bilingual schools in the area, most of whom promptly lost it. It deserves full publication. The works of Herrera and Acosta are less obscure, being available from the publisher, but are not easy to find otherwise.

Ethnobiologists should make sure that these books are in their local libraries!

E. N. Anderson
Dept. of Anthropology
University of California
Riverside, CA 92521-0418

LITERATURE CITED

ACOSTA BUSTILLOS, ELENA, J. SALVADOR FLORES GUIDO, ARTURO GÓMEZ-POMPA. 1998. Uso y Manejo de Plantas Forrajeras para Cria de Animales Dentro del Solar en una Comunidad Maya en Yucatán. Universidad Autónoma de Yucatán, Mérida, Yucatán.

HERRERA CASTRO, NATIVIDAD DELFINA. 1994. Los Huertos Familiares Mayas en el Oriente de Yucatán. Universidad Autónoma de Yucatán, Mérida, Yucatán.

LOVE, BRUCE and EDUARDO PERAZA CASTILLO. 1984. *Wahil kol,* a Yucatec Maya agricultural ceremony. Estudios de Cultura Maya 15:251-300.

TERÁN, SILVIA and CHRISTIAN RASMUSSEN. 1994. La Milpa de los Mayas. Authors, Mérida, Yucatán.

Journal of Ethnobiology 19(2): 221-225 Winter 1999

ETHNOBOTANICAL OVERVIEW OF *GOGD* (*Allium ramosum* L.): A TRADITIONAL EDIBLE WILD PLANT USED BY INNER MONGOLIANS

KHASBAGAN
Department of Ethnobiology, Kunming Institute of Botany, the Chinese Academy of Sciences Kunming, 650204, the People's Republic of China

NARISU
Department of Renewable Resources, University of Wyoming, Laramie, Wyoming 82071, USA

KEVIN STUART
Qinghai Education College, Xining, Qinghai 810008, the People's Republic of China

ABSTRACT.– Plants have figured prominently in Mongols' food and shelter. The traditional collecting, processing and preservation of ***gogd*** (*Allium ramosum* L.) as a Mongol food are recorded. The authors present the way of preparation of the leaves and inflorescence of the plant as a dish or condiment and suggest efficient means for its conservation and utilization.

Key words: ***gogd,*** *Allium ramosum* L., edible plant, Mongol food, utilization

RESUMO.– Plantas desempenharam um papel proeminente nas dietas e abrigos dos Mongóis. São registrados a colheita, o processamento e a preservação tradicionais de ***gogd*** (*Allium ramosum* L.) como uma comida Mongólica. Os autores mostram a maneira de preparação das folhas e inflorescências desta planta para ser um prato ou um condimento e eles sugerem meios eficientes para a sua preservação e utilização.

RÉSUMÉ.– Les plantes figurent fréquemment dans la nourriture et dans l'abri des Mongols. Les méthodes traditionnelles de la collection, préparation et préservation du ***gogd*** (*Allium ramosum* L.) comme une nourriture Mongole sont décrites. Les auteurs présentent la voie de préparation des feuilles et des inflorescences de cette plante comme un plat ou condiment. Ils proposent aussi une méthode efficace de la conservation et de l'usage de cette plante.

INTRODUCTION

Mongols have been nomadic herders on the Mongolian Plateau grassland for centuries. At present, Mongols are distributed in Mongolia, the People's Republic of China (Inner Mongolia Autonomous Region, Qinghai, Xingjiang Uighur Autonomous Region, Liaoning, Jilin and Heilongjiang provinces), Russia (Buryatia Autonomous Republic Within Russian Federation), and Kazakhstan Republic (within Commonwealth of Independent States). Various factors, such as loss of

prime grassland to agriculture, have led some Mongols to adopt agriculture, although many continue to raise livestock. Khasbagan and Yumzab (1988) have discussed Mongol traditional botanical culture and usage of wild plants. These authors argue that the intimate relationship Mongols have traditionally had with their environment led them to utilize natural resources rationally.

Allium ramosum L. is similar to cultivated chive (*A. tuberosum* Rottl. ex Spreng.). However, *A.ramosum* has longer, hollower, and narrower leaves that are pointed at the end, and a perianth lobe with a red middle vein, while *A. tuberosum* has flat, solid leaves, and a perianth lobe with a green middle vein, distinguishing them from each other. Cultivated chive originated in the eastern part of Asia (Shan 1994), while *A. ramosum* is distributed widely in northern China, Mongolia, and Russia (Uljihutag 1985; Shan 1994; Yuquan 1994). *Allium ramosum*, also called ***kherin gogd***, and ***zherlig gogd*** (***kherin*** and ***zherlig*** mean 'wild' in Mongolian), is a common edible wild plant traditionally used by Mongols. In the thirteenth century *Secret History of the Mongols* (Anonymous 1240), the plant was recorded as ***gogosum*** and reported as being eaten by Temujin (name of Chinggis Khan) and his family (Khasbagan 1996). Lobsangchuiden (1918) called the plant ***gogosu*** and reported it as "a plant used as food by Mongols for a long time" in the *Records of Mongol Customs*. Yunatov (1958) noted that "the plant is used as food by herdsmen." The word ***gogd*** derives from ***gogosum*** (Eldentai and Ardezab 1986). In Inner Mongolia, our identification of collected specimens demonstrates that the plant referred to by locals as ***gogd*** is *A. ramosum*. ***Gogosu*** could have been another synonym, although we have not found any reference dealing with it.

The first two authors' investigations indicate that the plant remains a source of food in the Inner Mongolia Autonomous Region grassland area. Unfortunately, no systematic study of the plant's collection, processing, and preservation has been found in the literature. From 1986 to 1996, the first author carried out investigations in herding areas of the Inner Mongolia Autonomous Region. A number of Mongolian herdsmen, peasants, l*amas* (practitioners of Buddhism, most of them are also medical practitioners), and physicians were interviewed and specimens of the plant were collected. Additionally, the first two authors were born in Mongol grassland areas and are personally familiar with how the plant is used in their home area. During the course of research, twenty specimens were collected from different areas, identified, and housed at the Department of Biology, Inner Mongolia Teachers' University.

MONGOL FOOD CULTURE

In the mid 9th century, Mongols began to engage in nomadic herding (Dujian 1985). At present in Inner Mongolia, the geographic areas where Mongols reside can be grouped into herding areas, herding-farming areas, and farming areas. Major traditional food sources have been meat, milk, and milk by-products. Although these traditional food sources continue to be important in the first two areas, grains such as *Panicum miliaceum* L. var. *eftusum* Alef. have become an important source of food as well. While Mongols in the farming and herding-farming areas (most of them in eastern Inner Mongolia) have their own gardens to grow vegetables, such

as onions, cabbages and potatoes, many Mongols in the herding and herding-farming areas do not have access to gardens in order to grow vegetables for family consumption, because of nomadic or semi-nomadic herding practices. Individuals in these two areas get most of their fresh vegetables from a banner (administrative unit similar to a county) town. In these areas, some wild plants became important vegetable sources. For past ten years, we have identified twenty species of wild plants used as vegetables in Inner Mongolia (unpublished data), twenty species of wild plants used as tea (Khasbagan 1990), and fifteen species of wild plants used for their edible fruits (Khasbagan 1995).

COLLECTION, PROCESSING, AND USAGE OF *GOGD*

Collection.– Collecting ***gogd*** is a part of everyday life during the growing season of a year. ***Gogd*** is collected when it is about ten cm tall, and the peak time for harvesting is May through July. The above-ground parts, consisting primarily of leaves, are picked by women, elders, and children near residential areas, or by men traveling on horseback or animal-drawn carts to distant places in order to collect large amounts of ***gogd*** (4 to 5 kg, fresh weight) for preservation and future use. It is also common for individuals during the course of traveling on foot and doing outdoor work, such as herding livestock, to gather the plant daily in order to obtain enough fresh material (around 0.3 kg) for a family meal. In August and late July, when the plants blossom, people collect the inflorescence, which is also called ***soriz***. Approximately one to two kg in fresh weight are usually gathered and processed in a similar way to that of the leaves.

Processing and Usage.– After collection, ***gogd*** can be processed as a main dish. The leaves are washed and cut into 2-3 cm pieces and preserved with salt in a container. One kg of ***gogd*** is commonly mixed with 0.15-0.20 kg of salt. The inflorescence is ground and a similar ratio of salt is added. The dish may be eaten immediately or kept in a container to be eaten within a few days.

Gogd leaves are also added to pots of cooking mutton to make the broth and meat more palatable. Some Mongols prefer adding ***juuhei*** (liquid that stays above yogurt when yogurt is made in a container) in the soup. Mongols also serve steamed or boiled dumplings stuffed with ***gogd*** leaves which are then cut into small pieces and mixed with ground mutton and ***juuhei***. This dish is customary in the Kheshigten Banner of Ulaanhad League.

Preservation for winter usage is also common. The amount of material collected is related to availability and could reach as much as seven kg. The processed leaves, inflorescences, or mixture, according to availability and individual family preferences, are placed in containers for future use, and salt added in amounts dictated by individual preferences. This preservation method is seen in Kheshigten Banner and Left Barin Banner, Ulaanhad League and the two Ujimchin Banners of Xilingol League. In Left Barin Banner, Ulaanhad League, five to six kg of ***gogd*** is collected in late fall when the growing season of the plant ends. After preservation, the dish is ready to be eaten in a few days and is called ***soriz*** in Left Barin Banner (Ulaanhad League). It is served on a small plate with other dishes at mealtime.

Fresh ***gogd*** may be used as a condiment for dishes. ***Gogd*** may also be sun dried for a few days, ground into a powder, and used as a condiment in winter. ***Soriz*** may be processed similarly to ***gogd***, but only the inflorescence is used and then mixed with salt (1 kg inflorescence, 0.1 kg salt, 0.5 kg sour milk). Once the mixture is ground into a pulp, it may be served as a condiment for other dishes. Additionally, a small amount of ***soriz*** (about 0.01kg) is added to sheep blood intestines and cooked as sausage.

DISCUSSION

It is a Mongol taboo to dig out the roots of ***gogd*** in most areas (Ulaanhad and Xilingol Leagues). Considerable care is therefore taken while collecting leaves and blossoms so as not to damage the roots. This is an example of traditional Mongols conservation of wild plants.

Utilization of ***gogd*** as a food by Mongols has been restricted to the level of family consumption. Deteriorating grassland conditions and increasing population pressures are threatening ***gogd*** as a resource. Consequently, some Mongols are growing wild ***gogd*** near their homes. The authors believe that this is an important step toward overcoming a current shortage of wild plant resources.

Of special note is that many Mongols assert that ***gogd*** is efficacious as a tonic for stomach ailments. Although there is no written information regarding this claim, further work is needed to better understand the nutritional and medicinal values of ***gogd***, as well as possibilities for potential large-scale production.

ACKNOWLEDGMENTS

We are grateful to indigenous herdsmen, peasants, *lamas*, and Mongolian physicians we interviewed during our investigations in Inner Mongolia Autonomous Region, the People's Republic of China.

LITERATURE CITED

ELDENTAI and ARDEZAB. 1986. Annotated and Restored Secret History of Mongols. Inner Mongolia Education Press, Huhhot. (In Mongolian).

DUJIAN, W. 1985. A brief history of Mongols. Inner Mongolia People's Press, Huhhot. (In Chinese).

KHASBAGAN. 1990. A preliminary study of plants used as Mongolian traditional tea. Acta Botanica Yunnanica 12: 43-48. (In Chinese).

KHASBAGAN. 1995. Ethnobotanical study on wild edible fruits of Mongols in Arhorchin Banner, Inner Mongolia, China. Journal of Inner Mongolia Normal University (Natural science edition) 72: 60-63. (In Chinese).

KHASBAGAN. 1996. Wild edible plants recorded in "Secret History of Mongols." Journal of Arid Land Resources and Environment 10: 87-94. (In Chinese).

KHASBAGAN and YUMZAB. 1988. Traditional Mongolian botanical culture. Journal of Inner Mongolia Normal University (Natural science edition) 10: 87-94. (In Mongolian).

LOBSANGCHUIDEN. 1918. Records of Mongol Customs. Inner Mongolia People's Publishing House, Huhhot. (In Mongolian).

SHAN, C. 1994. Resources of Forage Plants in Chinese Grasslands. Liaoning Nationality Press, Shenyang. (In Chinese).

ULJIHUTAG. 1985. Key to the Forage Plants in Grasslands of Mongolian People's Republic. National Publishing House, Ulaanbaatar. (In Mongolian).

YUNATOV, A. A. 1958. (translated by H. ZHAOHUA). Forage Grassland Plants of the Mongolian People's Republic. Science Press, Beijing. (In Chinese).

YUQUAN, M. 1994. Flora of Inner Mongolia, Vol. 5, (2nd edition). Inner Mongolia People's Publishing House, Huhhot. (In Chinese).

People, Plants, and Landscapes: Studies in Paleoethnobotany. Kristen J. Gremillion, editor. University of Alabama Press, Tuscaloosa. 1997. Pp. xviii; 271. $29.95 (Paperback) ISBN: 0-8173-0827-x.

One of the more inexplicable aspects of archaeology this century is that, despite growing recognition of the importance to human societies of plant resources, surprisingly little emphasis has been placed on the recovery and interpretation of those remains by archaeologists. There have been notable exceptions, of course, as represented by the work of Braidwood, Yarnell, Flannery, Watson, and others, and by the 1970s, paleoethnobotanical studies were regularly being conducted by a small number of practitioners across North America to produce an unprecedented wealth of information on prehistoric plant use. Yet full acceptance that paleoethnobotany as a vital component of archaeology has been surprisingly slow, and in some respects, it has been ghettoized. Despite its immense potential to contribute information pertinent to both Big Questions (e.g., where and when were plants first domesticated?) and those of more local significance (e.g., what plants were eaten at this site?), the recovery and analysis of samples for paleoethnobotanical sampling are still not routinely practiced at most archaeological sites.

This well-edited volume offers a strong challenge to this situation by demonstrating how clearly paleoethnobotany can illuminate aspects of past settlement, subsistence, and economic practices otherwise inaccessible. No less importantly, it offers new ways of thinking about the relationships that have existed between people and the dynamic landscapes they occupied, with each influencing the other.

The collection is derived from a Society of American Archaeology symposium in honor of Richard Yarnell, a pioneer in this field, who in 1992 received the society's Fryxell Award for Interdisciplinary Research. Most of the contributors are former students or colleagues of Yarnell. United under the banner of human ecology, the authors explore two central themes: first, the process by which paleoethnobotany has evolved into a multidisciplinary entity, armed with formidable tools (e.g., electron microscopy, accelerator dating), and second, the development of a set of robust explanatory tools that include the integration of ecological and evolutionary theory. This approach gives this collection a coherence seldom found in *festschrifts*; indeed as Bruce Smith notes in the Foreword, "There is much in this book…that would please Yarnell far more than any glowing praise for him."

In both her well-crafted preface and introduction, Gremillion sketches the development of paleoethnobotany in North America, and how it has gradually shifted from description to explanation, with impetus provided by Julian Steward, Leslie White, and others. This short essay identifies several major themes in the history of the discipline, and thus provides a firm base for the chapters that follow.

The first part of the collection, "The Archaeological Record of Plant Domestication and Utilization," explores the evidence for the development of food production primarily in eastern North America, which is now viewed as an independent center of plant domestication. Patty Jo Watson begins with a succinct summary of the development of modern paleoethnobotany in the Near East, East-

ern Woodlands, and Southwest, which has "proceeded at different rates and along different trajectories" in each region. Kristen Gremillion reexamines a collection of plant remains originally recovered in Kentucky in the 1930s, using crop morphology and site chronology to explain increases in seed size of sumpweed, chenopodium, and other species through domestication. An amazing collection of five charred bags of seeds stored in an Arkansas rock shelter (also excavated in the 1930s) is investigated by Gayle Fritz, whose analysis of cucurbits, sunflower, and sumpweed from the cache indicates that plant husbandry was already well developed by 3000 years ago. Additional evidence for the indigenous development of Cucurbita pepo (italicize) is further explored by Wesley Cowan's study of seed morphology in archaeobotanical samples from Kentucky. The final paper in this section is by Gary Crawford, whose study of the ecological processes of domestication in Jomon Japan provides new insights into human influences on local landscape development.

The second part of the book, "Plant Resources, Human Communities, and Anthropogenic Landscapes," focuses on the cultural and ecological contexts of plant domestication and management. Margaret Scarry and Vincas Steponaitis examine changes in agricultural strategies associated with the rise the late prehistoric Moundville (Alabama) polity; paleoethnobotanical evidence there suggests that crop production strategies, such as communal fields, may have served as a type of risk management, while also influencing local landscape development. The application of evolutionary ecology models to understanding the transition from foraging to farming is detailed by Bruce Winterhalder and Carol Goland, who evaluate diet breadth, risk analysis, and production efficiency. Their study compliments Paul Gardner's predictive modeling of nut productivity and harvesting for Eastern Woodlands foragers, whose response to processing costs and periodicity of mast yields may have prepared them for post-foraging food production. The remaining two chapters utilize historical sources to explore the relationship of people to plants at very different scales. Gregory Waselkov relates a shift in Creek and Seminole agricultural field location to the development of the 18th century market economy, while Julia Hammett offers a sweeping survey of North American aboriginal plant management strategies, correlated to the geographic distribution of economically important plant families and agricultural intensification during the late Holocene.

What shortcomings the volume has are minor. All but one of the chapters focus on eastern North America, leaving Crawford's valuable study on plant domestication and anthropogenesis in Jomon Japan geographically isolated and not as well integrated into the collection as it should be. In fact, a different organizational scheme might have reduced the sometimes awkward feel of seemingly dissimilar chapters bound together within Parts 1 and 2, although each addresses the general issues used to define each part. There is also considerable difference in the length of chapters, leaving one wishing for a little more from Watson (13 pages) and a little less from Winterhalder and Goland (38 pages). Still, these are more preferential than problematic points. The volume is well illustrated and indexed, and the use of historical maps and paintings in two final chapters particularly informative.

This collection ultimately works well at two complimentary levels, the first concerned with what we now know about past use of plant resources, and the second with how we know what we know. It therefore serves as a valuable resource for both students and scholars interested in the dynamic nature of past human-environment interactions, and compliments other recent volumes, particularly Hastorf and Popper's *Current Paleoethnobotany* (1988).

Paleoethnobotany has become an indispensible component of contemporary archaeology, yet many remain unaware of its potential. In a letter cited by Gremillion (p. 23), William Webb wrote to botanist Volney Jones in 1935: "I have stirred through Indian beds and shoveled out bushels of 'trash' which in my ignorance I regarded as valueless. I now know that I have probably destroyed a large body of valuable information." This volume reminds us of how valuable that information may be.

George P. Nicholas
Department of Archaeology
Simon Fraser University/Secwepemc Education Institute
Kamloops, British Columbia V2H 1H1

Journal of Ethnobiology 19(2): 228-247 Winter 1999

PLANT SPECIES (POACEAE, ASTERACEAE, FABACEAE AND SOLANACEAE) AT AN ARCHAEOLOGICAL SITE IN THE SOUTHERN ARGENTINE PUNA

MARIA FERNANDA RODRIGUEZ
Consejo Nacional de Investigaciones Científicas y Técnicas
Instituto de Botánica Darwinion. Labardén 200
1642 San Isidro. Buenos Aires, Argentina

ABSTRACT.– This research studied the use of plant species, mainly from the family Poaceae but also from others (Asteraceae, Fabaceae and Solanaceae), by hunter-gatherer groups during the Archaic period (10000-3000 years BP). The work is based on materials recovered at an archaeological site in the southern Argentine Puna, Province of Catamarca: Quebrada Seca 3. The starting point for this study of the archaeobotanical record was a survey of current flora of the area and the ethnobotanical information recovered there. From the comparative anatomical and morphological analysis of the current and archaeological plants, these latter were identified. The results indicated presence of six species of the family Poaceae together with other plant remains from the Asteraceae, Fabaceae and Solanaceae. From these results, both areas of origin and probable uses of these species as well as some seasonality in the site occupation, were inferred.

Key words: Paleoethnobotany, archaeobotanical record, plant remains, plant use, seasonality

RESUMEN.– Este trabajo consiste en una investigación acerca del uso de especies vegetales pertenecientes a la familia Poaceae principalmente y a otras familias (Asteraceae, Fabaceae y Solanaceae) por grupos cazadores-recolectores durante el período Arcaico (10000-3000 años AP). Se basa en los materiales recuperados en un sitio arqueológico de la Puna Meridional Argentina, Provincia de Catamarca: Quebrada Seca 3. El punto de partida para el estudio del registro arqueobotánico fue el relevamiento de la flora actual del área y la información etnobotánica recogida en la misma. El análisis anatómico y morfológico comparativo de los vegetales actuales y arqueológicos permitió la identificación de los últimos. Los resultados indican la presencia de seis especies de la familia Poaceae y de otros restos vegetales pertenecientes a las familias Asteraceae, Fabaceae y Solanaceae. A partir de estos resultados se infieren las áreas de procedencia y el probable uso de estas especies y cierta estacionalidad en la ocupación del sitio.

RÉSUMÉ.– Ce travail est une recherche sur l'usage des espèces de végétaux-qui appertiennent principalment a la famille Poaceae et a d'autres familles (Asteraceae, Fabaceae et Solanaceae), par des groupes de chasseurs-recolecteurs pendant la période Archaique (10000-3000 AP). Il se base sur des materiaux recuperés dans un siège archéologique à la Puna Meridionale Argentine, Province de Catamarca: Quebrada Seca 3. Le point de départ pour l'étude du régistre archéobotanique fût le relèvement de la flore actuelle de la région et l'information ethnobotanique cueillie dans lá même. A partir de l'analyse anatomique et morphologique comparé des végétaux actuels et archeologiques, ces derniers ont été determinés. Les résultats indiquent la présence de six éspèces de la famille Poaceae et de restes

végétaux appartennant aux familles Asteraceae, Fabaceae et Solanaceae. A partir de ces résultats on infére les regions d'origine et l'usage probable des pièces et une certaine regularité stationnelle dans l'ocupation du stège.

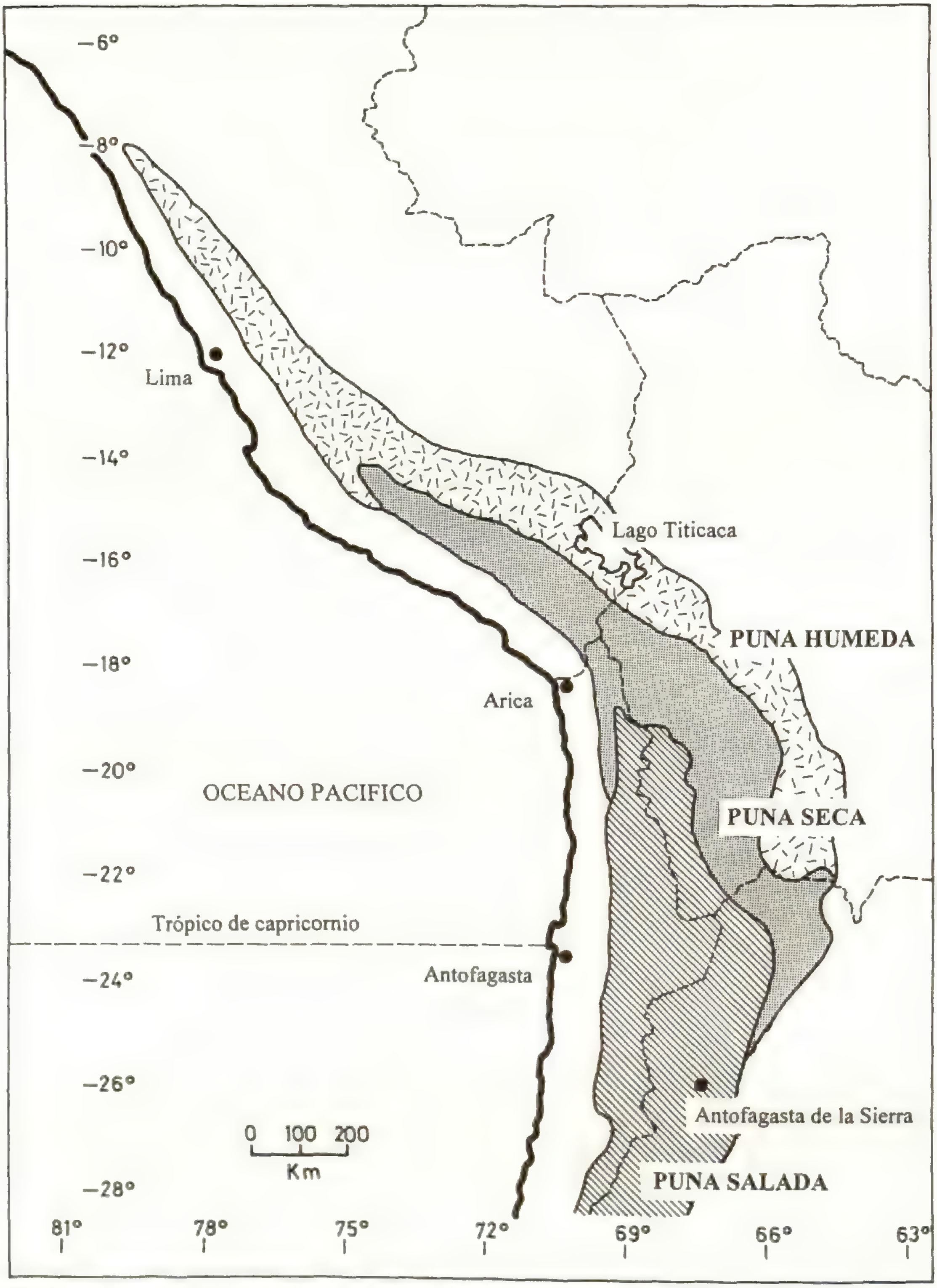


FIGURE 1.– Environmental division of the Puna (taken from Elkin 1996; adapted from Baied and Wheeler 1993, Fig. 1).

INTRODUCTION

In this study, the use of plant species primarily from the family Poaceae and additionally from other families (Asteraceae, Fabaceae and Solanaceae) by hunter-gatherer groups during the Archaic period (10000 to 3000 years BP) was investigated. The work is based on materials recovered at an archaeological site in the southern Argentine Puna: Quebrada Seca 3 (QS3) (Figures 1,2), located in the Hoyada of Antofagasta de la Sierra, Province of Catamarca. This research was part of the project: "Subsistence, interaction and social mobility in the Indian prehispanic past", conducted by Lic. Carlos Aschero and financed by Consejo Nacional de Investigaciones Científicas y Técnicas.

The starting points of this study were analysis of the current flora of the area and of ethnobotanical information obtained from interviews with inhabitants there. These data permitted assessment of the archaeobotanical record of the site.

To use information on current flora of the study area, it was necessary to evaluate in tandem the palaeoenvironmental changes that operated in the region. There is no recent information on this for Antofagasta de la Sierra. For this reason, data obtained in the northern Puna were considered. In general terms, the climate would have been cold and humid between ca. 10,000-7,500 BP, arid and somewhat warmer between ca. 7,500-4,000 BP, and similar to modern conditions from 4,000 BP on (Markgraf 1985, 1987; Elkin 1996). At present, there are zones of high concentration of resources in the Puna (Yacobaccio 1994). It was therefore probable that the locations of the plant resources remained stable through time, with variations instead being in the quantity and extent relating to the paleoclimatic changes described.

In relation to the archaeobotanical record, it is important to consider that plants could be present at the site because of human or natural (wind, animals) processes. Many of the plants there could thus be part of the chance deposits. These plants could still be useful in reconstructing the prehistoric environment and detecting the climatic changes operating through time (Dincauze 1987 in Schiffer 1988; Ford 1988), since many species show adaptation of anatomy to environmental conditions (Cutler 1978).

The ethnobotanical record offers a good basis on which to formulate hypotheses which could be tested in the archaeobotanical record. However, it is always necessary to use independent ways of contrasting and comparing these records. For example, consider the fact that the presence now of an edible species does not necessarily indicate that it was also consumed in the prehistoric past. Such conclusions require independent analysis with isotopic elements in human bones and coprolites, if any, to demonstrate both consumption and importance in the diet (Hastorf 1988).

Finally, the analysis of anatomy of current and archaeological plants and comparisons between them permit the identification of the latter plants and, in this way, the reconstruction of aspects of the prehistoric economy, i.e. the use of plant resources before the outset of domestication.

Thus, the following objectives were established:

(1) To identify the archaeological plants through comparison, by morphological and anatomical analysis, with current species of the study area.

(2) To analyze, according to the contextual associations and the known ethnobotanical information, the use that occupants of QS3 made of the plant resources.

(3) To determine, taking into account the environmental changes known to have operated, the origins of plant species used in QS3 based on their distributions in the current environment.

(4) To evaluate the possibility of considering plants as indicators both of seasonality in occupation of the sites and of the climatic changes through time.

Moreover, the following hypothesis was tested that the site QS3 was seasonally occupied according to the resources available in the surrounding area and was therefore part of a settlement system, i.e., of a group of sites with different function, located at different heights.

Geographical and environmental framework.– The Hoyada of Antofagasta de la Sierra is located towards the southern end of the puna. This region ranges from the south of Peru and center of Bolivia to the north-west of Argentina (Cabrera 1957), at coordinates 7°- 27° S and heights of 3,500-5,500 meters above sea level (a.s.l.) (Baied and Wheeler 1993) (Figures 1 and 2).

In Argentina, the puna has an arid climate with great temperature range and low atmospheric pressure. However, there are differences throughout its extent, mainly due to the decrease in precipitation both north to south and east to west. Troll (1958) recognized three zones based on characteristics of the vegetation and patterns of human behavior: humid puna, dry puna and salt puna. In this study, interest lies with the salt Puna, since Antofagasta de la Sierra is located there (Figure 1).

The modern climate is dry and cold and is characterized by great daily temperature range; it rains almost entirely in summer alone yet for most of the year snow is lacking. Precipitation occurs as hail or snow in the high mountains. These forms of precipitation vary in different areas of the puna, as well as during the year and from year to year. This variation in precipitation allows one to divide the Argentine puna into two zones: the puna of Jujuy, which occupies the more humid part of the north-west, with permanent rivers and more abundant vegetation, and the puna of Atacama to the south-west, which is very dry, lacking in rivers, and with large salt mines (Cabrera 1957). Antofagasta de la Sierra is located in this puna of Atacama.

From the phytogeographical point of view, Antofagasta de la Sierra corresponds to the Puneña Province of the Andino Dominion (Cabrera 1953, 1957, 1976). In this Province, the dominant vegetation is bushy steppe, but herbaceous, halophilic and sammophilic steppes and lowland are also present (Cabrera 1957, 1976; Cabrera and Willink 1980).

In the area surrounding the site a pasture of Poaceae has developed, where bushy species of the genera *Adesmia*, *Baccharis*, *Parastrephia* and *Fabiana* are abundant. These plant resources have at present foraging importance for the llama herds which graze there (Haber 1988). The area corresponds to the plant association of a range land (Cabrera 1953) at 3800 m a.s.l. Along the bottom of Quebrada Seca lowland develops, characterized by plant cover which includes species of Poaceae and Juncaceae (Pérez de Micou and Ancibor 1994). At 2.3 km from QS3 and below

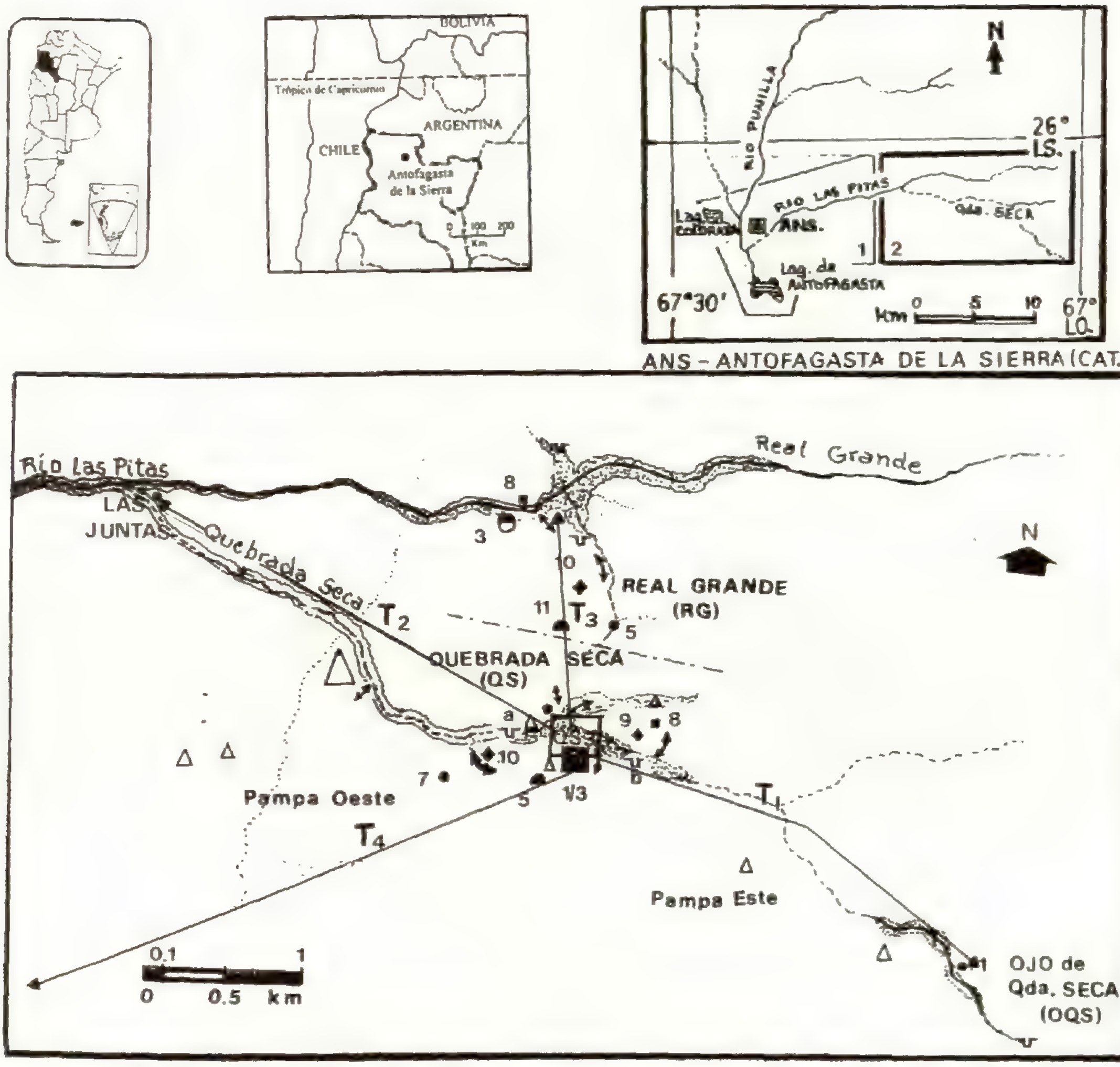


FIGURE 2.– Location of Antofagasta de la Sierra (Catamarca) and the locality of Quebrada Seca. Transects carried out during the analysis of areas of exploitation of plant resources around QS3: T1, transect, E direction; T2, transect, W direction; T3, transect, N direction, and T4, transect, SW direction.

3800 m a.s.l., commences the *tolar*, where bushy and sub-bushy species of the genera *Parastrephia* and *Acantholippia* are abundant.

Description of the site.– QS3 is a shelter located in the Hoyada of Antofagasta de la Sierra (Catamarca), on the southern margin of the lowland of Quebrada Seca, at 4100 m a.s.l. (Figures 2,3). It is oriented toward the NE and presents a protected area of 9 m x 5 m (Figure 4). This surface was divided into an outer sector and an inner sector, designed as eaves and cave respectively, because of the existence of an inner rocky peak which limited the space useful to live in. According to characteristics of each of these sectors, the first (with highest artefact densities) would correspond to an area where most of the activities were carried out and the second to a sleeping area (Aschero *et al.* 1991; Aschero *et al.* 1993-94).

Four main stratigraphic units were found. Layer 0/lens 1 x (muddy-sandy free surface layer with guano, contained carbonaceous sediments of apparent an-

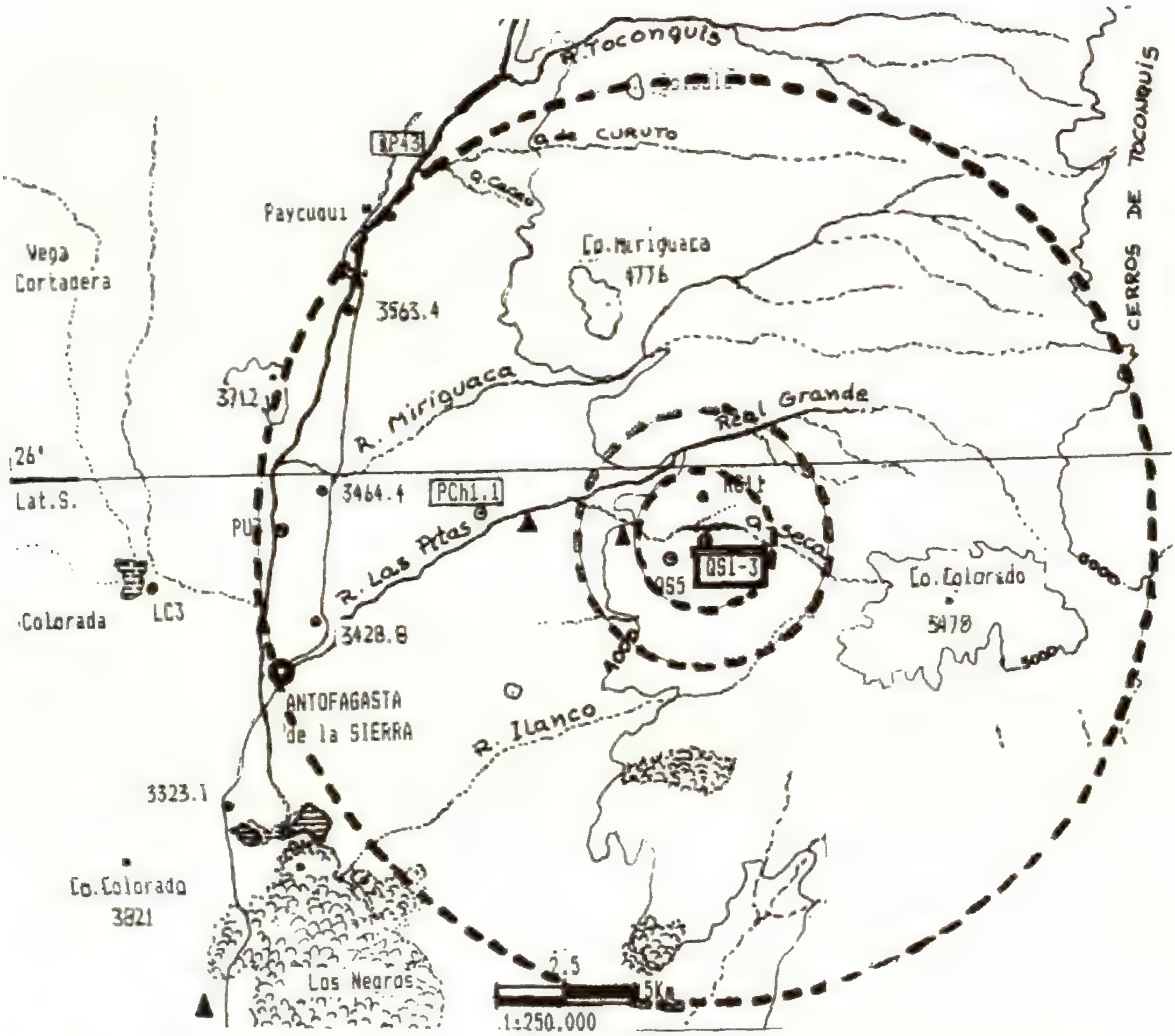


FIGURE 3.– Antofagasta de la Sierra (Catamarca). Areas of capture of native plant resources from QS3.

thropogenic origin); layer 1 (muddy-sandy compact sediment, archaeologically sterile); layer 2a (non-compact sandy sediment; grey to light brown colouration at the top, with scarce anthropogenic remains); layer 2b (sandy to sandy-muddy light brown sediment, with important anthropogenic contributions) (Aschero *et al.* 1991). Within this last layer, 25 levels of occupation were differentiated (Aschero, personal communication 1996) [1] (Table 1).

A date of 2480 ± 60 BP (LP – 278) was obtained in layer 2a, which corresponds to the Initial Lower Formative (Late Holocene). For this work, special interest was in layer 2b. The radiocarbon dates assessed from different levels of occupation gave an important archaeological sequence about the Archaic period (Early and Middle Holocene). These datings lay between the extremes of 4510 ± 100 BP: Level 2b2 (BETA 27801) and 9410 ± 120 BP: Level 2b25 (LP - 881) (Table 1).

MATERIALS AND METHODS

The starting point of this study was the surveying, identification and anatomical analysis of plant species of the area in order to compare these results with the archaeological record of QS3.

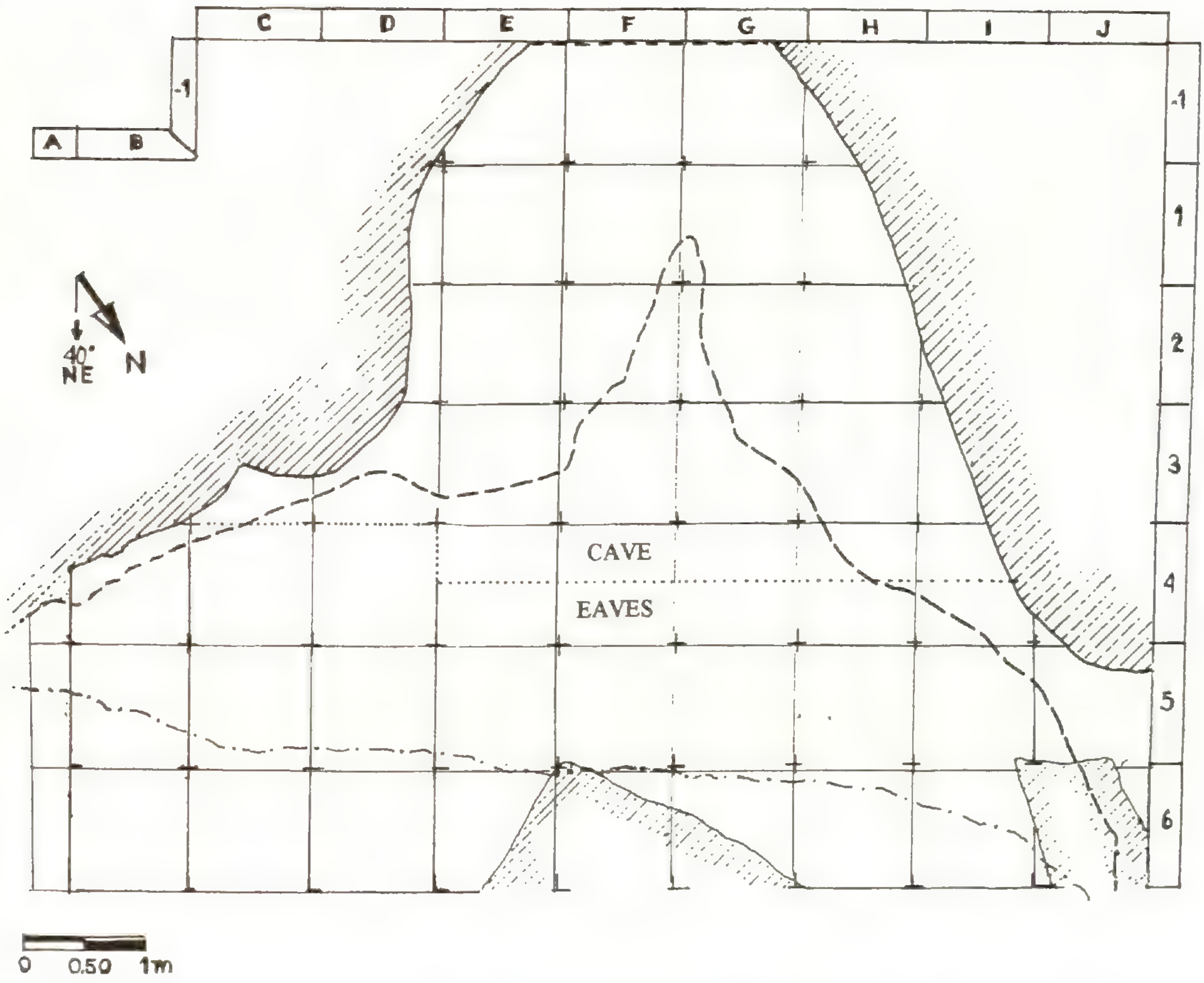


FIGURE 4.– Floor of level 2b4 of QS3, indicating the squares (letter and number). Survey carried out by Lic. Carlos Aschero.

The ethnobotanical information was used to determine the probable use that human groups who occupied the site made of the plant resources. In this context, four inhabitants of Antofagasta de la Sierra were interviewed.[2] They were selected because they are very old inhabitants of the area. The questions asked of them were related to use of the plants that grow in the area.

Current material.– Four transects were carried out in different directions from QS3, following natural topographic lines which connect different microenvironments (Figure 2). The area surrounding the site considered as the most probable area of economic exploitation with minimum energy consumption was determined previously (Bailey 1983). For each transect, the direction, route, distance, duration of the walk, characteristics and changes in vegetation relating to types of soils and presence or absence of water, were all considered. In all transects, relevant geographical points (ravines, water courses, plant associations) were taken as reference and the time taking in walking to get there was recorded. On the return, the collections of plants were made. These were subsequently identified at the Instituto de Botánica Darwinion (SI), where they were later deposited in the Herbarium as part of the reference collection for analysis of the archaeological material.

TABLE 1.–Stratigraphy and chronology of QS3.

LAYER and LEVEL	DATE (years BP)	PALEOCLIMATE–PERIOD	
0- lens 1x		Late Holocene	Formative
1			
2a	2480 ± 60		
2b1	5400 ± 90	Middle Holocene	Archaic
2b2	4510 ± 100		
2b3	4770 ± 80		
2b4			
2b5	5380 ± 70		
2b6			
2b7			
2b8	6160 ± 100		
2b9	7220 ± 60		
2b10			
2b11	7130 ± 110		
2b12			
2b13			
2b14	7350 ± 80		
2b15		Early Holocene	Archaic
2b16	8330 ± 110		
2b17			
2b18	8640 ± 80		
2b19			
2b20			
2b21			
2b22	9050 ± 90		
2b23			
2b24			
2b25	9410 ± 120		

For anatomical analysis of structure of Poaceae, leaves and floral stems of these specimens were taken. Transparency of the former was emphasized following the technique of Dizeo de Strittmatter (1973). For floral stems, cross-sections were made manually. All histological sections were stained with safranine fast-green (D'Ambrogio 1986), later examined and photographed by optical microscope. The epidermis of leaves was also examined and photographed by Scanning Electronic Microscope (SEM). This material is also part of the reference collection (Numbers: SI 28209 to 28211, 28337 to 28342).

Archaeological material.– The excavation of the site was carried out by sectorial *decapage* following natural layers. For layer 2b, with sandy matrix, the work was carried out following the distribution of ecofacts and artefacts on site. When concentration of remains was observed, the extractions were separated until the concentration terminated. In this manner, cultural levels were obtained and named as levels of occupation.

At each level of occupation, squares of 1 m x 1 m were drawn (Figure 4) and subdivided into microsectors of 0.5 m x 0.5 m. These latter were the real units of excavation. Within each, the documented material was separated in floors of scale

1:10. In each floor, the depths of beginning and end of each extraction for the extremes of each microsector were recorded as were those of artefacts, combustion and accumulation structures. In this way, it was possible to determine the density of remains by microsector in cubic meters and to obtain a tridimensional record of the instruments and structures of the site (Aschero *et al.* 1993-94).

Plant remains comprised the archaeobotanical record of the site. The macroremains recovered were gathered in the following ways:

(1) **Ecofacts** (plant remains which gave no evidence of human modification before use): firewood (wood and charcoal); grasses with and without reproductive organs; other smaller plant remains (flowers, fruits and leaves). These appeared many times in the archaeobotanical record as parts of *structures,* i.e., of non-portable artefacts, such as fires and straw layers (Renfrew and Bahn 1993).

(2) **Artefacts** (plants, with modifications of anthropogenic origin, to be used for some purpose): instruments to make fire, shafts, wood cut in bevel, decorated woods, worn culms, cords, baskets and remains of basketwork.

It is important to indicate the presence of a funeral bundle at level 2b2. It was a cover of camel-hide, tied with a woollen cord, which contained the bony remains of a human foetus (Aschero et al. 1991). The bundle was surrounded by, and rested on, bunches of grasses (Figure 5).

In this study, species of Poaceae and small plant remains of Asteraceae, Fabaceae and Solanaceae were examined. The woody specimens of the latter three families were analyzed in a recent publication (Rodríguez 1998c). The materials

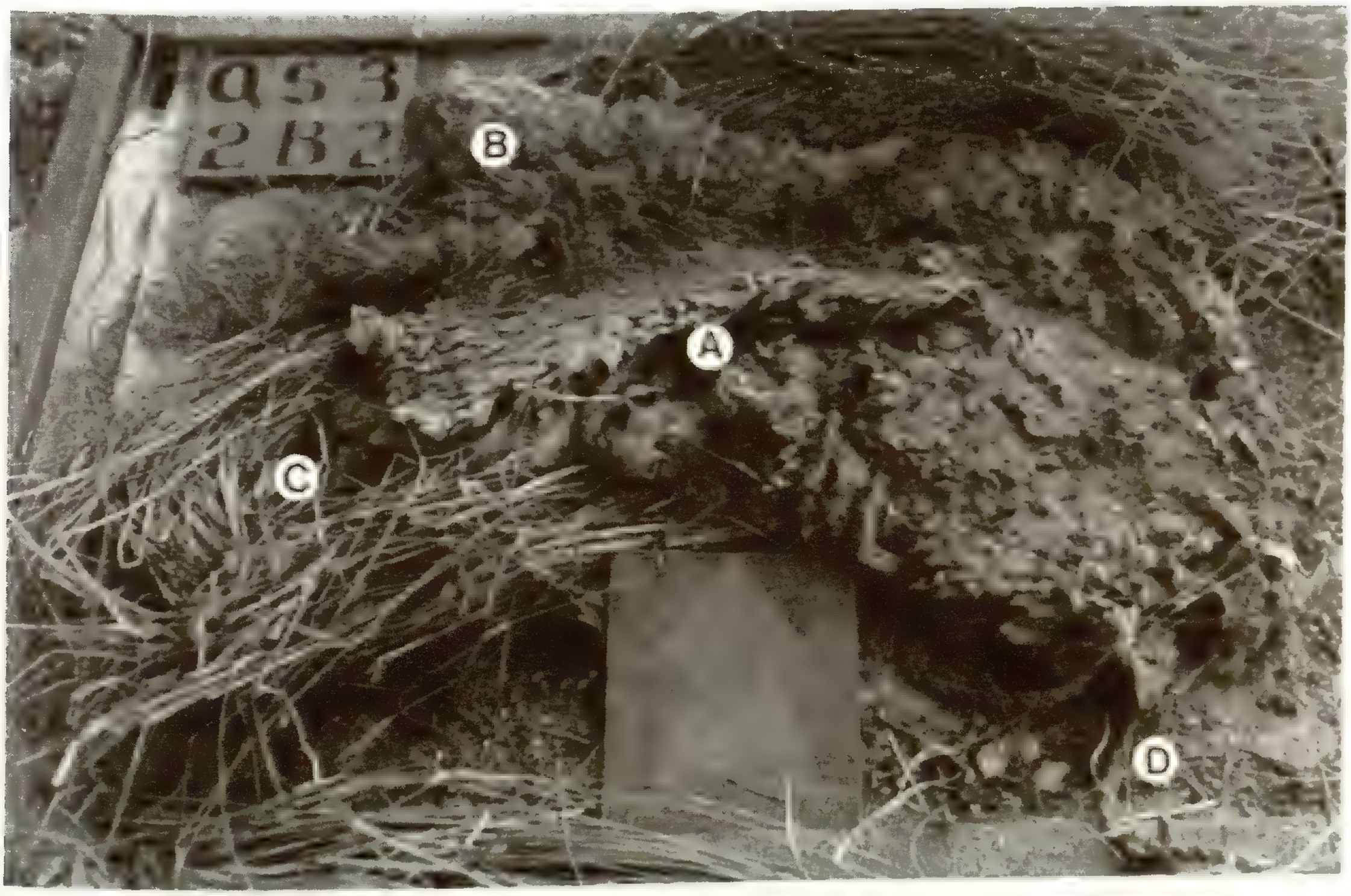


FIGURE 5.– Funeral bundle, level 2b2: A, human foetus; B, camel-hide; C, truss of grasses; D, woollen cord.

recovered are held in the Instituto Nacional de Antropología y Pensamiento Latinoamericano. The grasses with reproductive organs were identified. Some leaves and floral stems of these specimens were separated and current material was examined as detailed above. These histological sections are also part of the reference collection. The leaves and floral stems of Poaceae lacking reproductive organs and forming part of accumulations and straw layers were studied in the same way.

The analysis of leaf anatomy, through morphology of stomata, silica bodies and cork cells, and of structure of the floral stem permitted identification of some genera. In such cases, histological sections from the reference collection were used as basis for comparison with standard botany texts (Metcalfe 1960; Nicora and Rúgolo de Agrasar 1987).

Finally, amplified color laser copies of smaller plant remains were taken; the epidermis of selected remains was examined and photographed by SEM. Families involved were identified by morphological characteristics of reproductive and vegetative tissues.

RESULTS

Ecofacts.–Poaceae. Grasses (Table 2) were present at some levels of QS3, forming layers of considerable size at 2b10 but more isolated elsewhere. At 2b2, they were part of the funeral bundle mentioned above (Figure 5). Some specimens possessed both vegetative and reproductive tissues. The remains generally consisted of isolated leaves, husks and floral stems. Analysis of the latter by optical microscope and SEM permitted identification of tribe Festucaceae throughout and placed certain specimens in genera *Deyeuxia, Festuca, Puccinellia* and *Stipa*.

It is important to emphasize the excellent conservation state of specimens with flowers, identifiable to species in most cases. For each such species from the archaeobotanical record, the origin of current specimens used as comparison material was recorded.

Figure 6, based on Table 2, represents graphically the number of archaeological specimens of each species or genus from the different levels of occupation.

Deyeuxia eminens J. Presl. Origin of current material: Punilla river (20 km from QS3). Plant association: lowland. Archaeological material: epidermis consisted of long cells with ondulating walls, silica bodies and cork cells. The adaxial epidermis was covered by unicellular hairs and the abaxial epidermis by prickles. The complex of the stomata was of subrectangular shape. Silica bodies and cork cells were grouped in pairs, lying between the long cells. Two inflorescences were also observed. Specimens with vegetative and reproductive tissues of *Deyeuxia eminens* were found at layer 2a and at levels 2b2 (funeral bundle, Figure 5), 2b4, 2b5, 2b10 and 2b12 of layer 2b. Isolated vegetative tissues of this species were also found at 2b2 (funeral bundle), 2b5, 2b10, 2b11, 2b12 and of material of the genus *Deyeuxia* at additional levels, such as 2b11. *Deyeuxia eminens* was the most frequent member of the Poaceae in the archaeobotanical record of QS3. It was abundant in straw layers and the funeral bundle. Some leaves and husks from genus *Festuca* were

also identified in the latter. *D. eminens,* because of morphological characteristics, formed soft layers suitable for sleeping, possibly therefore being preferred by occupants of the site.

Festuca weberbaueri Pilg. Origin of current material: field of the Hoyada of Antofagasta de la Sierra. Very scarce at present, but more abundant in the recent past (Haber 1987). Dense and relatively hard bushes of material. Plant association: *tolar.* Archaeological material: specimens in flower were found at level 2b4 of QS3.

TABLE 2.–Poaceae and other plant remains in the archaeobotanical record of QS3. Symbols: **Spp**. Species, **Dey**. *Deyeuxia eminens*, **Fwe**. *Festuca weberbaueri*, **Fort**. *Festuca ortophylla*, **Fchry**. *Festuca chrysophylla*, **Sti**. *Stipa sp*, **Puc**. *Puccinellia frigida*, **Ast.** Asteraceae, **Fab.** Fabaceae, **Sol**. Solanaceae, **cap.** capitula, **rec.** receptacles, **fr.** fruits with pappus, **cip.** cipsela, **hus.** husks, **infl.** inflorescences, **flow.** flowers, **leav.** Leaves. For Poaceae, only specimens with reproductive tissues were considered. The following frequencies are indicated: +++= very frequent; ++= frequent and += less frequent.

POACEAE Frequency							**Other plant remains**		
Spp. Levels	Dey.	Fwe.	Fort.	Fchry.	Sti.	Puc.	Ast.	Fab.	Sol.
2a	+						6 cap. 4 rec.		
2b1							3 cap. 5 rec.		1 infl.
2b2	+++			+			18 cap. 20 rec.	4 hus.	
2b4	++	++				+	15 cap. 17 rec. 9 leav.	2 hus.	
2b5	+++		+				7 cap.	3 hus. 1 flow.	
2b8							2 cap.		
2b10	+++			++			1 cap.		
2b11	+						1 cap.	1 hus.	
2b12	++				+		4 cap. 1 fr. 1 cip. 4 leav.		1 flow.
2b14							3 cap.		
2b15							1 fr.		
2b17							2 cap.		
2b18							1 cap. 1 fr.		
2b19									
2b21							2 cap.		
2b22							5 cap. 3 fr.		
2b24									
2b25							1 fr.		
Total							147	11	2

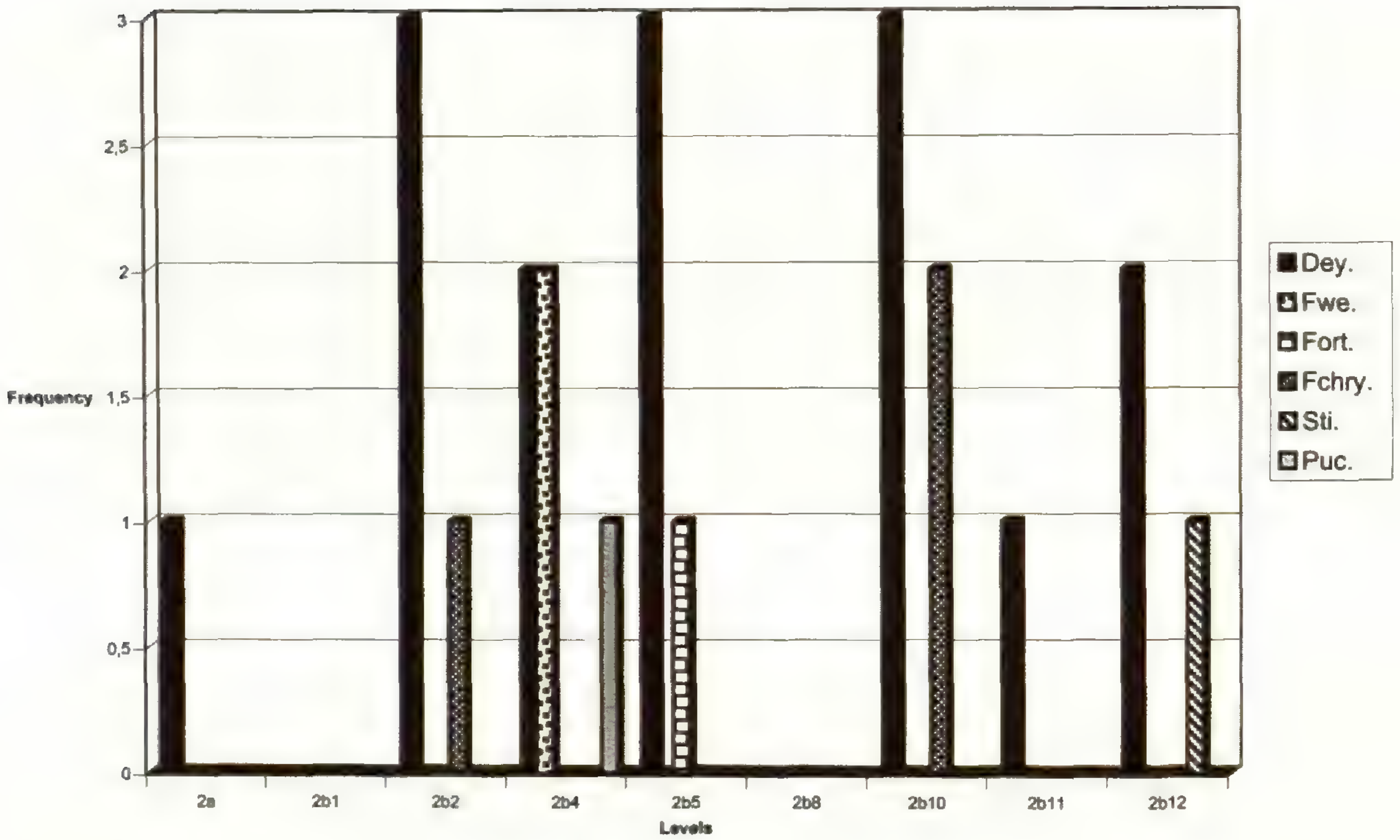


FIGURE 6.– Poaceae. Symbols: In plotting the Poaceae, the following frequencies are indicated: +++= 3 (very frequent); ++= 2 (frequent) and += 1 (less frequent). **Dey**. *Deyeuxia eminens*, **Fwe**. *Festuca weberbaueri*, **Fort**. *Festuca ortophylla*, **Fchry**. *Festuca chrysophylla*, **Sti**. *Stipa sp*, **Puc**. *Puccinellia frigida*. Only the upper levels (2b1- 2b12) from which the groups of grasses were recovered were considered.

Festuca ortophylla Pilg. Origin of current material: slopes and high hillocks of Quebrada Seca. Plant association: range land. Archaeological material: these were plants from arid areas, the leaves of this species therefore being very narrow and generally in rolled. The epidermis, in surface view, consisted of mixed long cells with ondulating walls and short cells. In cross-section, the abaxial epidermis abutted various layers of fibers in contact with the vascular truss. This adaxial epidermis was also itself strengthened by fibers and long unicellular hairs and deep furrows. The vascular trusses were characteristic of Festucaceae tribe. A specimen of *Festuca ortophylla* bearing flower and isolated vegetative tissues was found at 2b5. Given the presence of specimens in flower, this species was apparently not abundant, but could have been present among other specimens of the genus *Festuca* in the straw layers.

Festuca chrysophylla Phil. Origin of current material: Quebrada de Real Grande (Haber 1987). Plant association: range land. Archaeological material: in the epidermis, long cells with ondulating walls and short cells were clearly present. This epidermis was covered by abundant long unicellular hairs and prickles. Siliceous and suberose cells were arranged in pairs among the long cells. Specimens in flower and with isolated vegetative tissues were found in straw layers of level 2b10. These layers consisted of an important structure (See *Archaeological material)* which occu-

pied the two squares at the center of the cave. Because of its disposition this structure formed a surface suitable for sleeping.

Puccinellia frigida (Phil.) I. M. Johnst. Origin of current material: comparison material was not collected in the study area, since at present the species appear scarce there. Archaeological material: in archaeobotanical material of QS3, the first specimen of *Puccinellia frigida* with inflorescences was found at level 2b4.

Stipa sp. Origin of current material: slopes and high hillocks of Quebrada Seca. Plant association: range land. Archaeological material: long cells with ondulating walls and short cells formed the epidermis. The silica-suberose pairs were inserted among the long cells. The lower epidermis bore long unicellular hairs. Specimens of *Stipa* lacking reproductive tissues were found at 2b12. This genus was infrequent in QS3. Its morphological characteristics make it unsuitable as a bed for sleeping, probably why it appeared only isolately and not as part of layers.

Other plant remains.–In this group, isolated vegetative and reproductive tissues, such as flowers, fruits and leaves, were included (Table 2). All such material was very damaged and in most cases only identified to families or more rarely to genus or species. Some of these remains could have arrived at QS3 through natural events as mentioned above.

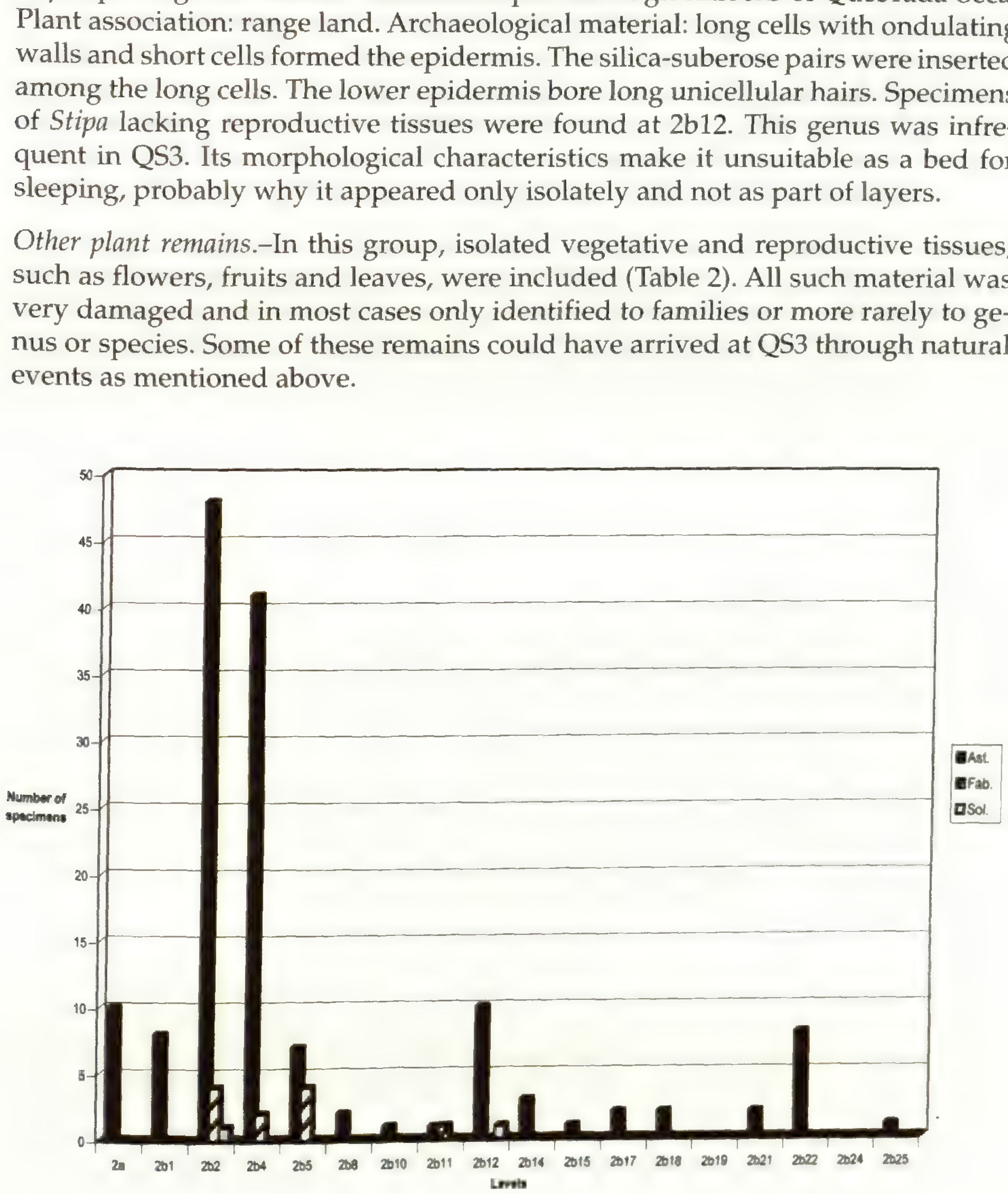


FIGURE 7.– Other plant remains. Families Asteraceae (**Ast**.), Fabaceae (**Fab**.) and Solanaceae (**Sol**.).

At all analysed levels of occupation in layer 2b (except at 2b19 and 2b24) and throughout layer 2a, plant remains were found. These were grouped by families and arranged in order of importance based on number of specimens present. Figure 7, based on Table 2, represents graphically the number of archaeological specimens of each family, at different levels of occupation.

Asteraceae. The most frequent family in the archaeobotanical record of QS3. Remains of inflorescences (capituli), mainly involucral bracts, remains of receptacles, or complete isolated flowers, in layer 2a and at levels 2b1-2b14, 2b17-2b18 and 2b21-2b22, and fruits with dispersal mechanism (the pappus) at levels 2b1, 2b12-2b15, 2b18, 2b22 and 2b25. Some remains from level 2b12 were examined by SEM. These corresponded to a *cypsela*. At levels 2b4 and 2b12, leaves of *Baccharis incarum* Wedd. were found. These were small, subrhomboid, coriaceous and with dentate edges. Those at level 2b12 were examined by SEM. The abaxial epidermis showed a great number of stomata, while in the adaxial epidermis they were scarce. Both epidermies were very papillose. On these leaves were found animal hairs.

Fabaceae. Fruits - husks or legumes- of *Hoffmanseggia eremophila* Phil. were found at levels 2b2, 2b4-2b5 and 2b11; one flower of *Adesmia sp*. was found at level 2b5; the remains of a flower, petals and shoots were found at level 2b4. At level 2b5 (5380 $\pm$ 80 AP), a broken husk of *Arachis sp*. (n. v.: peanut) was found. This probably was a wild species related to *A. monticola*. It was not a local plant, since it has not found in the study area. The distribution of the native species involved as origin of the cultivated peanut was limited to the north-west of Argentina (Antofagasta de la Sierra was excluded) and south-east of Bolivia (Krapovickas and Gregory 1994).

Solanaceae. At level 2b1, an inflorescence was recovered, and at level 2b12 a flower of *Fabiana sp*. was recovered and examined by SEM.

Finally, some plant remains, unidentifiable because very fragmented or incomplete, were found at certain levels. In layer 2a and at level 2b2 were remains of shoots and fruits; at level 2b4 were some shoots; at level 2b12 were different fruits.

Artefacts.– Two fragments of basketwork made with a coiled technique were found at level 2b11. In both cases, the work was produced by using the lateral portion of the leaf of *Cortaderia* as a basis and the mediam nerve as the stitch (Rodríguez 1998 a - b). A basketwork fragment was recovered at level 2b5 and a completely decorated basket, burnt in its lower part, was located in layer 0/lens 1 x. These employed the same raw materials found in previous fragments (Pérez de Micou and Ancibor 1994). Two straw knots made with floral stems of *Deyeuxia eminens* were recovered at levels 2b11 and 2b12 of QS3 (Rodríguez 1998; Rodríguez and Rúgolo de Agrasar 1999). Some species of subfamily Bambusoideae were also used in making artefacts. There were found three shafts and three worn culms (stems) of *Chusquea lorentziana* Griseb. and two smaller fragments of worn culms of *Rhipidocladum* sp. (Rodríguez 1998 b). None of these is a local species and the use of the culms is not clear, except for the shaft.

Structures.– At various levels of QS3, grasses were distributed forming straw layers, i.e., layers of grasses arranged horizontally; in others, they were grouped

together in small accumulations. To define locations of these structures at the different levels of occupation of the site, the following parameters were considered: orientation of QS3 in the landscape, squares (see Figure 4), and division of available space into two sectors: eaves and cave.

In layer 2a there were no other layers or concentrations of grasses. At level 2b1 was a small group in square D4, to the E side of the eaves sector. At level 2b2 there was a straw layer, described earlier, as part of the funeral bundle (Figure 5). *Deyeuxia eminens* forms the principal species in this structure (Rodríguez and Rúgolo de Agrasar 1999). There were other concentrations of grasses in G3 and H3 (W side, cave sector), H5 (W side, eaves sector) and D4 (center, eaves sector). In squares F3/G3 of level 2b4, on the west side of the eaves sector, the main group of grasses of this level was arranged as a layer. Also in F3 animal hairs were found and the wing of a locust was recovered from these same plants. At level 2b5 there were two relatively small straw layers. One was located in D4 towards the center of the eaves sector, the other in E5 to the west in the same sector. At level 2b8 practically no grasses were found.

The most important layer was located at level 2b10 in squares E2/F2/G2. This location corresponded to the center-west of the cave sector. The upper border of the layer was surrounded by stones holding it in place, and base was resting on level 2b12. Bird feathers were found mixed with the grasses.

At level 2b11, three very small straw layers occurred distributed in D4 (center, eaves sector) and in F3/F4 (to the W, cave-eaves sectors). The two fragments of basketwork associated with the layer and a bunch of compact straw with a sticky substance, mixed with stems of *Atriplex* sp., were found in F3.

At level 2b12, the main group of grasses formed a layer arranged in E4 and extended into E5 (center, eaves sector). Animal hairs mixed with these plants and a bevelled branch of *Parastrephia quadrangularis* (Meyen) Cabrera were also recovered there. Lower concentrations of grasses occurred in G3/G4 and F3/F4 on the west side of the cave-eaves sectors. A knot made with *Deyeuxia eminens* was associated with these groups in G3 as was a shaft made with *Chusquea lorentziana* in G4.

At the other levels of occupation, grasses were very scarce, with no important accumulations. The grasses generally appeared mixed with woods and in some cases with charcoal.

DISCUSSION AND CONCLUSIONS

From the available archaeobotanical record, it is possible to compare part of the ethnobotanical information and relate it to possible use of the archaeological plants present in QS3. Taking into account both sources of information, species found at the site were grouped together into the following categories: combustible, forage, edible, medicinal and plants used for technological purposes. The forage category is not important in this case, since a hunter-gatherer site is involved.

It should be pointed out that the use of plants as fuel and for technological purposes can be corroborated with relative certainty from the archaeobotanical

record. Their uses as foods and medicines, by contrast, can only be established as hypothesis from the available information.

From those categories listed in the first paragraph, primary interest was in the last three. Within these, species present could be grouped as follows.

Edible species.– Those older people consulted mentioned very few edible plant species, probably because such plants were largely replaced by agriculture. Haber (1987) mentioned as edible the resin produced during the spring by *Baccharis incarum* ***(lejía)***. Similarly, *Hoffmannseggia eremophila*, known as *algarrobita* in Antofagasta de la Sierra, presented edible tubers (Ulibarri 1979). In relation to the husk of *Arachis sp*. ***(peanut),*** it is important to emphasize that, although this species is now considered edible, since only one specimen was recovered and that no a local plant, certain group mobility and/or probable exchange within other human groups of inhabitants of QS3 were inferred as probable main explanations.

Medicinal species.– *Baccharis incarum* (beneficial to liver function) and *Fabiana punensis* Arroyo ***(tolilla)*** (which relieves muscle pain). The woody specimens (the stems) of both species, used as fuel, were found very frequently within the archaeobotanical record of QS3 (Rodríguez 1998 c).

Plants used for technological purposes.– Under this heading, only archaeobotanical records were considered, since current use of plants for these purposes hardly agrees with that in the prehistoric past. From the archaeological information here, the following species grouping for plants emerged:

Artefact manufacture. *Cortaderia sp., Deyeuxia eminens* ***(pastos)***, *Chusquea lorentziana* and *Rhipidocladum sp* (Rodríguez 1998 a – b; Rodríguez and Rúgolo de Agrasar 1999).

Conditioning of floors of occupation (arrangement in layers of surface grasses). Mainly *Deyeuxia eminens* but also *Festuca chrysophylla, F. weberbaueri, F. ortophylla, Puccinellia frigida* and *Stipa sp* ***(pastos)***.

Taking into account probable areas of origin and uses of the plant resources found in QS3, the following probable circuits of mobility within small distances were established (Figure 3):

Likely edible and medicinal plants. Distances traveled in these cases could have oscillated between 0 and 2.5 km from the site, in SW and N directions. This agrees with the postulated area limitations for plants used as fuel (Rodríguez 1998c).

Conditioning of occupation floors. Distances in this case increased, since the most commonly used species, *Deyeuxia eminens*, grows at present further away from QS3 (20 km; beyond range of transects which were carried out from QS3); however, different species of *Festuca* (except *F. chrysophylla*) and *Stipa* recovered, grew near the site. The area therefore includes a radius ranging from approximately 0 to 20 km west from QS3. This range probably would have been smaller in the past, because recent herding practices have somewhat reduced grass coverages.

Artefact manufacture. Lower probable distances correspond to the known raw materials used in basket work, and include a radius beginning at 4 km away from the site and ending at 17 km from the site, in a westerly direction.

In relation to mobility over great distances, as mentioned earlier, the presence of *Arachis* sp. establishes the probable existence of large circuits of considerable mobility and exchange. In QS3, artefacts made with non-local plants, such as *Chusquea lorentziana, Rhipidocladum* sp. *Salix humboldtiana* Willd., *Prosopis torquata* (Cavanilles ex Lagasca) DC, and *Acrocomia totai* Mart. (Rodríguez 1998 a - b).

Finally, in the hypothesis postulated initially, the possibility that QS3 was part of a settlement system and would therefore have been seasonally occupied was considered. The presence of reproductive tissues (flowers and fruits of the families Asteraceae, Fabaceae and Solanaceae) at most levels of QS3 and equally there of species whose life-cycle completes in a season, corresponding to spring-summer, such as *Deyeuxia eminens* and *Festuca weberbaueri* among others, indicated occupation during those months and the beginning of the autumn. This conclusion was reinforced by the presence of newborn camelids in the archaeofaunistic record (Elkin 1996). Smaller plant remains could be at the site because of chance natural causes; grasses are therefore in this case more secure as evidence in establishing seasonality.

However, the possibility of occupation during the rest of the year cannot be excluded. It is necessary to take into account that at the lower levels (2b15 and following levels) very few reproductive tissues were recovered, and that at some such levels (2b19 and 2b24) these were absent. Grasses too were absent there. Elkin (1996) considered feasible an occupation of the site during the coldest months, based on availability of vicunas, in the lowland and in the *pampa* near the site, during the whole year. The artifactual data provides no information in relation to seasonality.

Taking into account that, in the area of location of QS3, there were available resources during the whole year (Elkin 1992) and from the archaeobotanical data, it is possible that the site could have been temporarily occupied at different seasons. Such occupations would have been longer during the warmer months, without necessarily excluding short periods of occupation during the winter.

In this study, the potential importance of plants in reconstruction of the past has been emphasized. This emphasis involved biological and cultural aspects. On the one hand, the possibility of deducing palaeoenvironments from archaeological plant species found in the stratigraphy, has been pointed out. On the other hand and in relation to human culture and living processes, various aspects from the archaeobotanical record, such as use of plants and characteristics of the environment in the prehistoric past in the Argentine Puna, were considered.

Comparative anatomical and morphological analysis of both current and archaeological species permits levels of identification of these latter and aids subsequent conclusions. The two disciplines involved here -archaeology and botany- both constantly cross-contribute to the other throughout this analysis. The questions posed to either lead to responses derived from information acquired jointly by both.

NOTES

[1] Lic. Carlos Aschero. Consejo Nacional de Investigaciones Científicas y Técnicas. Facultad de Ciencias Naturales e Instituto Miguel Lillo. Universidad Nacional de Tucumán. San Martín 1545. (4000) San Miguel de Tucumán. E-mail: iarqueo@unt.edu.ar.

[2] The population density is 0.02 inhabitants/km2. The informants who participated in this study were: Nemesio Darío Reales, Cástulo Epifanio Vázquez, Angela Vázquez and Vicente Morales.

ACKNOWLEDGEMENTS

I thank Drs. Elena Ancibor and Cecilia Pérez de Micou for their guidance in carrying out this work, which is part of my Ph. D. dissertation. I also thank Lic. Carlos Aschero for allowing me to participate in his overall project and for his support during this stage, as well as Prof. Zulma Rúgolo for her assistance in the identification of the archaeological grasses and Dr. James Price for his valuable help with the translation of this article.

LITERATURE CITED

ASCHERO, C., D. ELKIN and E. PINTAR. 1991. Aprovechamiento de recursos faunísticos y producción lítica en el precerámico tardío. Un caso de estudio: Quebrada Seca 3 (Puna Meridional Argentina). Actas del XI Congreso, Nacional de Arqueología Chilena, Santiago (October 1991) 2: 101-114.

ASCHERO, C., L. MANZI and A. GOMEZ. 1993-94. Producción lítica y uso del espacio en el nivel 2b4 de Quebrada Seca 3. Relaciones de la Sociedad Argentina de Antropología 19: 191-214.

BAIED, C. and J. WHEELER. 1993. Evolution of high Andean puna ecosystems: environment, climate and culture change over the last 12,000 years in the central Andes. Mountain Research and Development 13 (2): 145-156.

BAILEY, G. 1983. Hunter-Gatherer Economy in Prehistory: A European Perspective. Cambridge. University Press of London, London.

CABRERA, A. L. 1953. Esquema fitogeográfico de la República Argentina. Revista del Museo de Botánica 8: 87-168.

_____. 1957. La vegetación de la puna Argentina. Revista de Investigaciones Agrícolas 11 (1): 317-413.

_____. 1976. Regiones fitogeográficas Argentinas. Fascículo 1, pp. 85. *in* Enciclopedia Argentina de Agricultura y Jardinería, W. F. Kugler (editor). Acme S.A.C.I., Buenos Aires.

CABRERA, A. L, and A. WILLINK. 1980. Biogeografía de América Latina.. Secretaría General de la organización de los Estados Americanos. Serie de Biología. Monografía 13, Washington D. C.

CUTLER, D. F. 1978. Applied Plant Anatomy. Longman Group Limited, London.

D'AMBROGIO DE ARGUESO, A. 1986. Manual de Técnicas en Histología Vegetal. Editorial Hemisferio Sur. Buenos Aires, Argentina.

DIZEO DE STRITTMATTER, C. 1973. Nueva técnica de diafanización. Boletín de la Sociedad Argentina de Botánica 15 (1): 126-129.

ELKIN, D. 1992. Explotación de recursos en relación con el sitio acerámico Quebrada Seca 3, Antofagasta de la Sierra, Puna de Catamarca. Shincal 2: 1-14. Esuela de Arqueología, Universidad de Catamarca.

_____. 1996. Arqueozoología de Quebrada Seca 3: Indicadores de subsistencia humana temprana en la Puna Meridional Argentina. Ph. D. dissertation. Facultad de Filosofía y Letras. Universidad de Buenos Aires.

FORD, R. 1988. Little things mean a lot: Quantification and Qualification in Paleoethnobotany. Pp. 215-222 *in* Current Paleoethnobotany: Analytical Methods and Cultural Interpretation of Archaeological Plant Remains, C. Hastorf and V. Popper (editors). University of Chicago Press, Chicago.

HABER, A. 1987. Análisis de dipsonibilidad de recursos en Antofagasta de la Sierra, Puna Argentina, en relación con sistemas adaptativos agro-alfareros tempranos (Formativos): Primer Informe. Universidad de Buenos Aires

———. 1988. El recurso del método. Simposio: Estrategias Adaptativas en Arqueología. Precirculados del IX Congreso Nacional de Arqueología: 40-51. Buenos Aires.

HASTORF, C.A. 1988. The use of paleoethnobotanical data in prehistoric studies of crop production, processing and consumption. Pp. 119-141 *in* Current Paleoethnobotany: Analytical Methods and Cultural Interpretation of Archaeological Plant Remains, C.A. Hastorf and V. Popper (editors). University of Chicago Press, Chicago.

KRAPOVICKAS, A and W. C. GREGORY. 1994. Taxonomía del género *Arachis* (Leguminosae). Bonplandia 8 (1-4): 1-186.

MARKGRAF, V. 1985. Paleoenvironmental History of the last 10,000 Years in Northwestern Argentina. Zentralhlatt fur Geologie und Palantologie, Stuttgart.

———. 1987. Paleoclimates of the southern Argentine Andes. Current Research in the Pleistocene 4: 150-157.

METCALFE, C. R. 1960. Anatomy of the Monocotyledons. I Gramineae. Clarendon Press, Oxford.

NICORA, E. and Z. RUGOLO DE AGRASAR. 1987. Los géneros de Gramíneas de América. Ed. Hemisferio Sur.

PEREZ DE MICOU, C. and E. ANCIBOR. 1994. Manufactura cestera en sitios arqueológicos de Antofagasta de la Sierra, Catamarca. República Argentina. Journal de la Société des Americanistes 80: 207-216.

RENFREW, C. and P. BAHN. 1993. Arqueología, Teoría, Métodos y Prácticas. AKAL, Madrid.

RODRIGUEZ, M. F. 1998a. Arqueobotánica de Quebrada Seca 3: Recursos vegetales utilizados por cazadores-recolectores durante el período Arcaico en la Puna Meridional Argentina. Ph. D. dissertation. Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires.

———. 1998b. Arqueobotánica de Quebrada Seca 3 (Puna Meridional Argentina). Especies vegetales utilizadas en la confección de artefactos durante el Arcaico. In press: Relaciones de la Sociedad Argentina de Antropología 24.

———, 1998c. Woody plant species used during the archaic period in the Southern Argentine Puna. Archaeobotany of Quebrada Seca 3. In press: Journal of Archaeological Science.

RODRIGUEZ, M. F. and ZULMA RÚGOLO DE AGRASAR. 1999. *Deyeuxia eminens* (Poaceae: Agrostideae) en un sitio arqueológico de la Puna Meridional Argentina (Provincia de Catamarca). Darwiniana 37 (3-4): 229 – 242.

SCHIFFER, M. B. 1988. The structure of the archaeological theory. American Antiquity, 53 (3): 461-485.

TROLL, C. 1958. Las culturas superiores andinas y el medio geográfico. Revista del Instituto de Geografía 5: 3-55.

ULIBARRI, E. A. 1979. Especies argentinas de *Hoffmannseggia eremophila* (Leguminosae). Darwiniana 22 (1-3): 135-158.

YACOBACCIO, H. 1994. Biomasa animal y consumo en el Pleistoceno-Holoceno Surandino. Arqueología. Sección Arqueología. Instituto de Ciencias Antropológicas, Facultad de Filosofía y Letras, Universidad de Buenos Aires 4: 43-71.

Sacred Ecology: Traditional Ecological Knowledge and Resource Management. Fikret Berkes. Taylor and Francis, Philadelphia. 1999. Pp. 209. $29.95 (Paper) $59.95 (Hardcover) ISBN 1-56032-694-8.

The title mixes so many contradictory signals that the static might, unfortunately, cause some to try another station. After all, resource managers typically characterize relationships between people and environment in economistic and mechanistic terms. Under that rubric, the traditional must give way to the modern; the spiritual must yield to the scientific. But this title, on the one hand, seems to imply that traditional and scientific knowledge can merge into some sort of sacred, transcendental resource management for a New Age. On the other hand, contradicting that implied appreciation of non-Western knowledge, categorization as "traditional knowledge" suggests no more than a static residue of the premodern. And, if so, surely only selected fragments of such static knowledge, perhaps the pharmaceutical properties of a particular plant, not entire systems of belief as to why those properties occur, might usefully merge with Western science.

Those who do get past the unfortunate title will find that it belies a sophisticated consideration of just such complex issues by a pioneer in the study and application of non-Western ecologies. Part I (Concepts) defines basic terms and ideas such as traditional ecological knowledge (TEK), attempts to justify the use of "traditional" as an adjective, sketches the recent institutionalization of TEK's study and application, and describes the longer-term intellectual genesis of research on the ecologies of native peoples. Part II (Practice) presents case studies of native ecologies from around the globe, largely drawn from Berkes's own research and mostly focusing on the Cree of the Hudson Bay region. Part III (Issues) explores how local knowledge emerges, the challenges to maintaining and applying such knowledge, and the broader cultural implications of recognizing the validity of native ecological knowledges. While each part contributes certain insights, the case studies make for the richest reading. Berkes has spent three decades working among the Cree hunters and fishers of Chisasibi, and he cogently recounts what they have taught him about that particular place and how it has incubated more general insights about the dynamism and relevance of native ecologies.

The seeming intention to market this book as an undergraduate text, complete with "boxes" on such topics as A Cree Legend of the Flood, Zulu Herbalists, and others seems incompatible with the eclecticism necessary a cutting-edge book on "ethnoecology." Topics range from checking the fat content of a bear carcass to the cultural construction of Chief Seattle as an environmentalist icon. Successfully leading undergraduates through such an intellectual labyrinth might require better streamlining of such diversity -- and an extensive glossary.

With anthropologists, biologists, geographers and many others all contributing diverse perspectives, jargon, and phenomena, transdisciplinary unification remains a precarious goal. When considering cultural processes, for example, Berkes and other natural scientists seem drawn to organismic metaphors that persist as part of the myth of Western intellectual superiority that achieved global dominance during the colonial creation of the divide between the "developed"

and the "underdeveloped," between the "modern" and the "traditional." Such teleological thinking, involving concepts such as cultural adaptation and evolution, subsequently validated the belief that the postcolonial "Rests" simply need to emulate and catch up to the exceptional West. That myth and its conceptual residue cannot now provide a realistic basis for transcending itself, for addressing the social and environmental challenges that emerged together with that myth. Yet people who write books that begin to forge connections across disciplines and cultures, despite epistemological and other chasms, deserve great respect. Berkes has clearly made such a contribution based on sustained research in other cultures, broad reading across disciplines, and deep caring for lands and peoples.

Andrew Sluyter
Department of Geography
The Pennsylvania State University
University Park, PA 16802

Journal of Ethnobiology 19(2): 251-257 Winter 1999

RECENT DOCTORAL DISSERTATIONS OF INTEREST TO ETHNOBIOLOGISTS XVII

TERENCE E. HAYS
Department of Anthropology and Geography
Rhode Island College
Providence, RI 02908 USA

ABSTRACT.– This bibliography includes recent dissertations of interest to ethnobiologists. For each is given the page number where it may be found in Dissertation Abstracts (D.A.) and the order number for dissertation copies from University Microfilm International, P.O. Box 1764, Ann Arbor, Michigan 48106-1346 U.S.A. (Telephone: 1-800-521-3042; 1-800-343-5299 from Canada).

RESUMEN.– En este bibliografía se incluyen disertaciones recientes de interés a los etnobiólogos. Por cada uno se da el número de la página donde se halla el resumen en Dissertation Abstracts (D.A.), y el número de encargar un ejemplar de la disertación de University Microfilm International, P.O. Box 1764, Ann Arbor, MI 48106-1346 USA (telefono: 1-800-521-3042; desde Canada 1-800-343-5299).

RÉSUMÉ.– Cette bibliographie comprend quelques dissertationes recentes d'interet aux ethnobiologistes. Chez chaqu-une on donne le numéro de la page où se trouve le résumé dans Dissertation Abstracts (D.A.), et le numéro de commander un exemplaire de la dissertations de University Microfilm International, P.O. Box 1764, Ann Arbor, MI 48106-1346 USA (telephone: 1-800-521-3042; de Canada 1-800-343-5299).

INTRODUCTION

This is the seventeenth in an annual series of bibliographies listing selected dissertations drawn from the pages of Dissertation Abstracts (D.A.). All listings were made by scanning the titles and abstracts published in D.A. and making subjective decisions as to which ones might be relevant to work in ethnobiology or related disciplines such as ecological anthropology and economic botany.

Dissertations categorized in D.A. under Agricultural Economics, Agriculture, American Studies, Anthropology, Botany, Ecology, Environmental Sciences, Folklore, Geography, Language, Linguistics, Nutrition, Palaeobotany, Paleoecology, Paleozoology, Palynology, Veterinary Science, and Zoology were considered for inclusion in the list. An attempt was made to be as inclusive as possible, but some dissertations may have been overlooked. Comments and suggestions would be welcome for items to include in next year's edition.

Dates covered by the present paper include: Volume A (Humanities and Social Sciences): September 1998-December 1999 and Volume B (Sciences and Engineering): September 1998-December 1999. Note that these are the dates for the issues of D.A. in which the abstracts appear, rather than the dates of acceptance of the dissertations themselves.

The dissertations are listed below alphabetically by author, along with the year of acceptance, title, institution, length, adviser or major professor, number(s) of the page(s) in D.A. on which the abstract may be found, University Microfilms order number, and the ISBN number when this information was included.

Most of the dissertations accepted at institutions in the United States, and some of those from Australia, Canada, South Africa, and the United Kingdom may be obtained from University Microfilms International, either on microfilm or published by microfilm xerography. Quality of printed matter is generally excellent, but that of figures and photographs varies with the quality of the original. Current prices may be obtained by calling 1-800-521-3042; or 1-800-343-5299 from Canada. Further information and current prices, as well as information regarding how to order dissertations listed above with no UMI order number, may be obtained from UMI Dissertation Services, 300 North Zeeb Road, Ann Arbor, MI 48106-1346, USA.

Abstracts of the dissertations listed below as well as all others included in D.A. are now available online, with the full text of abstracts published since July 1980. This service is updated monthly, and includes UMI's entire dissertation database back to 1861. For further information regarding Dissertation Abstracts Online or Dissertation Abstracts Ondisc (CD-ROM) consult your local research librarian or UMI at the address given above regarding orders.

ALEXIADES, MIGUEL N. 1999. Ethnobotany of the Ese Eja: Plants, health, and change in an Amazonian society. City University of New York, 467 pp. Adviser: Christine Padoch. Order no. DA9917623. D.A. 60(1):21-B.

BELCHER, WILLIAM RAYMOND. 1998. Fish exploitation of the Baluchistan and Indus Valley traditions: An ethnoarchaeological approach to the study of fish remains. The University of Wisconsin-Madison, 517 pp. Supervisor: Jonathan M. Kenoyer. Order no. DA9813108. D.A. 59(4):1229-A.

BETTISON, CYNTHIA ANN. 1998. The determinants of settlement patterns among prehistoric agriculturalists of the Colorado Plateau: A case study from the Lower Zuni River valley, Arizona. University of California, Santa Barbara, 671 pp. Chairperson: Michael Glassow. Order no. DA9929454. D.A. 60(5):1636-A.

BOROJEVIC, KSENITA. 1998. The relations among farming practices, landownership, and social stratification in the Balkan Neolithic period. Washington University, 389 pp. Chairperson: Gayle Fritz. Order no. DA9834775. D.A. 59(5):1637-A.

BRODT, SONJA BRIGITTE. 1998. Leaning from the land: Local knowledge systems of tree management in central India. University of Hawaii, 317 pp. Chairperson: Brian Murton. Order no. DA9903826. D.A. 59(8):3143-A.

BROOKS, SARAH OSGOOD. 1998. Prehistoric agricultural terraces in the Rio Japo Basin, Colca Valley, Peru. The University of Wisconsin-Madison, 545 pp. Supervisor: William M. Denevan. Order no. DA9911668. D.A. 60(5):1699-A.

CAVIGLIA, JILL LORRAINE. 1998. Economic analysis of sustainable agriculture in the tropical rain forest of Brazil: Agricultural techniques in Rondônia. The University of Tennessee, 210 pp. Major Professor: James R. Kahn. Order no. DA9903898. D.A. 59(8):3110-A.

CHEN, WEI-CHUN. 1998. Models of prehistoric land use in the Gaoping region, southwest Taiwan. The University of Arizona, 291 pp. Director: John W. Olsen. Order no. DA9901765. D.A. 59(8):3050-A.

COGGINS, CHRISTOPHER REED. 1998. The tiger and the pangolin: Cultural ecology, landscape ecology, and nature conservation in China's Southeast Uplands. The Louisiana State University and Agricultural and Mechanical College, 677 pp. Directors: Stanley F. Stevens; Kent Mathewson. Order no. DA9902629. D.A. 59(8):3144-A.

CROTHERS, GEORGE MARTIN. 1999. Prehistoric hunters and gatherers, and the Archaic period Green River shell middens of western Kentucky. Washington University, 301 pp. Chairperson: Patty Jo Watson. Order no. DA9926436. D.A. 60(4):1198-A.

DELLO-RUSSO, ROBERT D> 1999. Climatic stress in the Middle Rio Grande Valley of New Mexico: An evaluation of changes in foraging behaviors during the Late Archaic/Basketmaker II period. The University of New Mexico, 321 pp. Chair: Wirt H. Wills. Order no. DA9926830. D.A. 60(4):1198-A.

DIRRIGL, FRANK JOSEPH, JR. 1998. Zooarchaeology and taphonomy of gallinaceous birds in the northeastern U.S. The University of Connecticut, 186 pp. Adviser: Robert Dewar. Order no. DA9906692. D.A. 59(9):3515-3516-A.

EATON, GEORGE FRANCIS. 1898 [sic]. The prehistoric fauna of Block Island, as indicated by its ancient shell-heaps. Yale University, 41 pp. [sic] Order no. DA9921316. D.A. 60(3):1005-B.

EHRLICH, CELIA. 1999. The ethnobotany of *Cordyline fruticosa* (L.) A. Chev.: The "Hawaiian ti plant." State University of New York at Buffalo, 644 pp. Adviser: Ann B. McElroy. Order no. DA9931479. D.A. 60(5):1644-A.

EISENSTRAUT, PHYLISSA JAYDE. 1998. Macrobotanical remains from southern Peru: A comparison of Late Archaic-Early Formative period sites from the Puna and Suni zones of the western Titicaca Basin. University of California, Santa Barbara, 299 pp. Chairperson: Mark Aldenderfer. Order no. DA9840769. D.A. 59(7):2575-A.

ERICKSEN, POLLY JOANNA. 1998. An evaluation of the sustainability of land management in a hillside agroecosystem in central Honduras. The University of Wisconsin-Madison, 219 pp. Supervisor: Kevin McSweeney. Order no. DA9813735. D.A. 59(5):1945-1946-B.

GASSÓN PACHECO, RAFAEL ANGEL. 1998. Prehispanic intensive agriculture, settlement pattern and political economy in the western Venezuelan llanos. University of Pittsburgh, 190 pp. Adviser: Robert D. Drennan. Order no. DA9900132. D.A. 59(7):2575-A.

GOLD, DEBRA LYNN. 1999. Subsistence, health and emergent inequality in late prehistoric interior Virginia. The University of Michigan, 343 pp. Chair: Richard I. Ford. Order no. DA9929831. D.A. 60(5):1637-A.

GONZÁLEZ, ROBERTO JESÚS, III. 1998. Zapotec science: Farming and food in the Northern Sierra of Oaxaca, Mexico. University of California, Berkeley, 368 pp. Chair: Laura Nader. Order no. DA9902083. D.A. 59(8):3055-A.

HAYES-BOHANAN, JAMES KEZAR, IV. 1998. Deforestation in Rondônia, Brazil: Frontier urbanization and landscape change. The University of Arizona, 196 pp. Director: Marvin Waterstone. Order no. DA9901679. D.A. 59(8):3145-A.

HENDERSON, HELEN HOPE. 1998. The organization of staple crop production in Middle Formative, Late Formative, and Classic Period farming households at K'axob, Belize. University of Pittsburgh, 412 pp. Adviser: Robert Drennan. Order no DA9837596. D.A. 59(6):2082-A.

HWANG, YOO JEONG. 1998. Forest land disturbance and geomorphological effects in Korea. University of Oregon, 163 pp. Order no. DA9900294. D.A. 59(7):2662-A.

ILAHIANE, HSAIN. 1998. The power of the dagger, the seeds of the Koran, and the sweat of the ploughman: Ethnic stratification and agricultural intensification in the Ziz Valley, southeast Morocco. The University of Arizona, 376 pp. Director: Thomas K. Park. Order no. DA9901680. D.A. 59(8):3056-A.

INDRIATI, ETTY. 1998. A dental anthropological approach to coca-leaf chewing in the Andes. University of Chicago, 263 pp. Adviser: Jane E. Buikstra. Order no. DA9910881. D.A. 59(11):4202-4203-A.

JONES, BRIAN DENIS. 1998. Human adaptation to the changing Northeastern environment at the end of the Pleistocene: Implications for the archaeological record. The University of Connecticut, 299 pp. Adviser: Kevin McBride. Order no. DA9906705. D.A. 59(9):3517-A.

KNAB-VISPO, CLAUDIA. 1998. A rain forest in the Caura reserve (Venezuela) and its use by the indigenous Ye'kwana people. The University of Wisconsin-Madison, 219 pp. Supervisor: Timothy Moermond. Order no. DA9825725. D.A. 59(5):1956-B.

KOZUCH, LAURA. 1998. Marine shells from Mississipian archaeological sites. University of Florida, 280 pp. Chair: Elizabeth S. Wing. Order no. DA9837413. D.A. 59(6):2082-A.

KRAMER, KAREN L. 1998. Variation in children's work among modern Maya subsistence agriculturalists. The University of New Mexico, 365 pp. Advisers: James Boone; Hillard Kaplan. Order no. DA9826634. D.A. 59(3):874-A.

LAGUEUX, CYNTHIA JEAN. 1997. Marine turtle fishery of Caribbean Nicaragua: Human use patterns and population characteristics of harvested animals. University of Florida, 217 pp. Chairperson: Kent H. Redford. Order no. DA9837417. D.A. 59(6):2502-B.

LAMA, LEWIS. 1998. Conflict and compatability: An inventory and analysis of land use in a Tanzanian wildlife corridor. State University of New York at Binghamton, 274 pp. Adviser: M.A. Little. Order no. DA9830608. D.A. 59(4):1237-A.

LIZARRALDE, MANUEL. 1997. Perception, knowledge and use of the rainforest: Ethnobotany of the Barí of Venezuela. University of California, Berkeley, 235 pp. Chair: Brent Berlin. Order no. DA9827018. D.A. 59(3):874-A.

MacDONALD, DOUGLAS HARLOW. 1998. Subsistence, tool-use, and reproductive strategies of northern plains Folsom hunter-gatherers: A view from the Bobtail Wolf site, North Dakota. Washington State University, 364 pp. Chair: William Andrefsky, Jr. Order no. DA9917438. D.A. 60(1):175-176-A.

MOORE, STAN LEIGH. 1997. Indigenous medical practice and knowledge in the medical culture of Dar es Salaam. University of Kansas, 309 pp. Adviser: John M. Janzen. Order no. DA9903068. D.A. 59(8):3057-3058-A.

MURRAY, MARIBETH S. 1997. Economic change in the Palaeoeskimo prehistory of the Foxe Basin, Northwest Territories. McMaster University (Canada), 153 pp. Adviser: A. Cannon. ISBN: 0-612-30163-X. Order no. DANQ30163. D.A. 59(8):3052-A.

MUSTANDI, ROBSON. 1998. Locally-evolved knowledge in livestock and range management systems in southern Zimbabwe's drylands: A study of pastoral communities in Beitbridge district. University of Waterloo (Canada), 340 pp. Adviser: Ronald Bullock. ISBN: 0-612-30634-8. Order no. DANQ30634. D.A. 59(9):3592-A.

MUTUNDU, KENNEDY KHABWOLI. 1998. Ethnohistoric archaeology of the Mukogodo in north-central Kenya: Contemporary hunter-gatherer subsistence and the transition to pastoralism in secondary settings. Washington University, 312 pp. Chairperson: Fiona B. Marshall. Order no. DA9834825. D.A. 59(5):1638-A.

O'FLAHERTY, R. MICHAEL. 1997. Managing a commons: Community management of indigenous woodlands in Chimanimani District, Zimbabwe. University of Toronto (Canada), 318 pp. Adviser: Richard B. Lee. ISBN: 0-612-28296-1. Order no. DANQ28296. D.A. 59(6):2088-2089-A.

OMENGAN, ELIZABETH APIL. 1998. Deforestation: Farming, logging, and forest management in northeast Thailand. University of Hawaii, 317 pp. Chairperson: Lyndar Wester. Order no. DA9903849. D.A. 59(8):3147-A.

OUNJIAN, GLENNA LORRAINE. 1998. Glen Meyer and prehistoric Neutral paleoethnobotany. University of Toronto (Canada), 941 pp. Adviser: Gary W. Crawford. ISBN: 0-612-35273-0. Order no. DANQ35273. D.A. 60(1):176-A.

PEACOCK, SANDRA LESLIE. 1998. Putting down roots: The emergence of wild plant food production on the Canadian Plateau. University of Victoria (Canada), 381 pp. Advisers: Nancy J. Turner; Michael C.R. Edgell. ISBN: 0-612-36647-2. Order no. DANQ36647. D.A. 60(3):785-A.

PERALES RIVERA, HUGO RAFAEL. 1998. Conservation and evolution of maize in the Amecameca and Cuautla Valleys of Mexico. University of California, Davis, 350 pp. Adviser: Stephen B. Brush. Order no. DA9900101. D.A. 59(7):3133-B.

REED, DAVID MILLARD. 1998. Ancient Maya diet at Lopán, Honduras. The Pennsylvania State University, 269 pp. Advisers: George R. Milner; Peter Deines. Order no. DA9901123. D.A. 59(8):3052-3053-A.

RUBINSKI, PATRICK MICHAEL. 1997. Pronghorn intensification in the Wyoming Basin: A study of mortality patterns and prehistoric hunting strategies. The University of Wisconsin-Madison, 410 pp. Supervisor: James B. Stoltman. Order no. DA9810597. D.A. 59(4):1231-1232-A.

SCHMIDT, CHRISTOPHER WILLIAM. 1998. Dietary reconstruction in prehistoric humans from Indiana: An analysis of dental macrowear, dental pathology, and dental microwear. Purdue University, 350 pp. Major Professor: R. Criss Helmkamp. Order no. DA9900256. D.A. 59(8):3061-A.

SHERPA, LHAKPA NORBU. 1999. Human impacts on high-altitude forest structures in the Nangpa and Hinku Valleys, Sagarmatha and Makalu-Barun National Park, Nepal. University of Washington, 157 pp. Chairperson: Chadwick Dearing Oliver. Order no. DA9924133. D.A. 60(4):1368-1369-B.

SHORR, NICHOLAS. 1999. Agricultural intensification in a large Tikuna community on the floodplain of the upper Brazilian Amazon. Indiana University, 368 pp. Chair: Emilio Moran. Order no. DA9932705. D.A. 60(6):2112-2113-A.

SHORT, SUSAN ALICE. 1998. When the animals still danced: Animal images in Mimbres pottery and petroglyphs. University of Minnesota, 510 pp. Adviser: Janet D. Spector. Order no. DA9907523. D.A. 59(9):3517-A.

SIMON, JAMES JOHNSON KOFFROTH. 1998. Twentieth century Iñupiaq Eskimo reindeer herding on northern Seward Peninsula, Alaska. University of Alaska Fairbanks, 399 p. Adviser: Peter P. Schweitzer. Order no. DA9842099. D.A. 59(7):2585-2586-A.

STAMP, JUDITH. 1998. Indigenous agroforestry and sustainable development in Mutoko Communal District, Zimbabwe. University of Toronto (Canada), 330 pp. Adviser: Michael Bunce. ISBN: 0-612-35332-X. Order no. DANQ35332. D.A. 60(1):211-A.

STEWART, FRANCESO LEEDHAM. 1997. Proto-Huron/Petun and proto-St. Lawrence Iroquoian subsistence as culturally defining. McGill University (Canada), 597 pp. Adviser: Bruce G. Trigger. ISBN: 0-612-30393-4. Order no. DANQ30393. D.A. 59(8):3053-A.

STRAND, JENNIFER GAIL. 1998. An analysis of the Homol'ovi fauna with emphasis of [sic] ritual behavior. The University of Arizona, 540 pp. Director: E. Charles Adams. Order no. DA9831838. D.A. 59(4):1232-A.

STRATTON, SUSAN K. 1999. Reconstructing the role of faunal resource use during the occupational history of Grass Mesa Village, southwestern Colorado. The University of New Mexico, 304 pp. Chair: Wirt H. Wills. Order no. DA9926880. D.A. 60(4):1200-1201-A.

SUMINGUIT, VEL JUTBA. 1998. Indigenous knowledge systems of agroforestry and the restoration of a despoiled environment: A case study in northwestern Mindanao, Philippines. University of Kentucky, 292 pp. Director: John van Willigen. Order no. DA9922639. D.A. 60(3):791-A.

SWALES, SUSAN EUGENIA. 1999. Dynamics of land use and agricultural practices in the Lower Amazon. University of Florida, 175 pp. Chairperson: Nigel J.H. Smith. Order no. DA9935300. D.A. 60(6):2167-A.

WALKER, PETER ABEL. 1997. Roots of crisis: Population, environment, and the social history of smallholder tree planting in Malawi. University of California, Berkeley, 209 pp. Chair: Michael J. Watts. Order no. DA9827140. D.A. 59(3):915-A.

WALKER, RENEE BEAUCHAMP. 1998. The late Paleoindian through Middle Archaic faunal evidence from Dust Cave, Alabama. The University of Tennessee, 302 pp. Major Professor: Walter E. Klippel. Order no.DA9903958. D.A. 59(8):3053-A.

WEERATUNGE-STARKLOFF, NIREKA DAYANITHA. 1998. Trees of desire: Gender, environmental knowledge and practice in the highland Uva of Sri Lanka. University of Toronto (Canada), 337 pp. Adviser: S.B. Philpott. ISBN: 0-612-35366-4. Order no. DANQ35366. D.A. 60(1):180-A.

WINKLERPRINS, ANTIONETTE M.G.A. 1999. Between the floods: Soils and agriculture on the lower Amazon floodplain, Brazil. The University of Wisconsin-Madison, 389 pp. Supervisor: Karl S. Zimmerer. Order no. DA9923209. D.A. 60(6):2168-A.

WORK, PAULA THORSON. 1998. Taphonomy and paleoecology of the midddle Holocene Lilenthal fossil biota, Cedar County, Iowa. The University of Iowa, 275 pp. Supervisors: Holmes A. Semken; Richard G. Baker. Order no. DA9834536. D.A. 59(5):2090-B.

WRIGHT, PATTI JO. 1998. The making of the carbonized macrobotanical record. Washington University, 362 pp. Chairperson: David L. Browman. Order no. DA9834847. D.A. 59(5):1638-1639-A.

YOUNG, DENNIS CRAIG, JR. 1998. Late Holocene landscapes and prehistoric land use in Warner Valley, Oregon. University of Nevada, Reno, 193 pp. Adviser: Don D. Fowler. Order no. DA9842479. D.A. 59(7):2577-2578-A.

The Ambonese Curiosity Cabinet. Georgius Everhardus Rumphius. Translated, edited, annotated, and with an introduction by E. M. Beekman. Yale University Press, New Haven, CT. 1999. Pp. cxii + 567. Ills., bibliography, index. $45.00 (hardcover). ISBN 0-300-07534-0.

This book is a genuine publishing event. Georg Rumph, who Latinized his name as "Rumphius," was one of the greatest naturalists of all time, and a hero in the history of science. His greatest work was his botany of east-central Indonesia, but that enormous work—it runs to 1,661 folio pages, in six volumes--remains untranslated. We are now fortunate to have, for the first time in English, his shorter work on stones and marine animals.

Rumphius (1627-1702) was a German soldier who came into Dutch service. Lured by the remote, he went to Brazil and in 1654 to Amboina, in the Moluccas (now in eastern Indonesia). Here he spent the rest of his life. He became a merchant and colonial official. He married a local woman and had children by her; after she died, he married a Dutch widow. In 1670 he went blind, apparently from cataracts, and had to complete his monumental natural history work from memory and from the help of his family and friends. I had always envisioned him as a dry-as-dust scholar, but he was in fact a veteran warrior, a man of the world, and an enterprising businessman—a man of action, par excellence, until his blindness.

A "curiosity cabinet" was a cabinet of shells and stones; such cabinets evolved into natural history collections. (At Cambridge University, one can see magnificent 18th-century cabinets of this sort and their collections, preserved as a sort of "metamuseum"; they evolved into a full-scale natural history museum there). Rumphius' is, in modern terms, a virtual cabinet; it exists in the form of a book about Moluccan marine life and interesting stones. The original edition appeared in 1705, in 340 folio pages, with 60 plates and 5 vignettes. These illustrations are all reproduced—excellently—in the present edition.

Rumphius described, in exquisite detail, the materials he collected, recording a great deal about the ecology and behavior of even the smallest shellfish. He describes, for example, phosphorescence, including the night-shine still present in slime washed up and onto the sand; he knew its connection with red tides and suspected it was caused by tiny organisms (as, of course, it is). He also recorded local names and beliefs with the same thoroughness. This is what makes his work important to the ethnobiologist. For example, much of the latter part of the book is taken up with descriptions of stones formed in the stomachs or flesh of various animals. Some such stones (bezoars, for example) were real; others were the creations of Indonesian con artists. All were believed by the Moluccans, and by many Europeans, to have magical properties. Rumphius not only records all the beliefs, but provides comparisons with equivalent Classical European beliefs as recorded by Pliny and others.

He has always been a prime source, especially to botanists, but those who cannot read Dutch or Latin have had to do without the benefit of his expertise.

Beekman's translation is, in its way, as amazing an effort as Rumphius' original labor of love. Beekman provides a full introduction that describes Rumphius' life and times as well as his *oeuvre*. Also found herein are 163 pages of notes—

large pages densely covered with fine print. Beekman has tracked down everyone mentioned in the text, located virtually every geographic site, identified animals and plants, supplied references scrappily indicated by Rumphius, and in every way done a job of annotation so monumental that it truly staggers the imagination. One could quibble with, or add to, several of the notes, but the level of accuracy is extremely high. His translation is lively and easy to read. To make it faithful to Rumphius' style, Beekman translated it into a somewhat modernized 17th-century English; no words not found in 17th-century sources are employed, and some 17th-century spellings and capitalization patterns are used. This sounds bizarre, but works perfectly. I have never had more pleasure in reading a work of descriptive natural history. Rumphius and Beekman can make even the description of a mollusk interesting, and, of course, the accounts of local belief are truly absorbing to anyone with a past in ethnoichthyology.

One wonders how anyone in this day and age can find time to carry out such scholarship. This was a work of true devotion.

The work is also beautifully designed, printed, and bound. The flyleaf notes that it was "Designed by Sally Harris / Summer Hill Books," and indeed Ms. Harris deserves recognition. In our degenerate age, when poorly bound paperbacks can cost almost $200, it is truly amazing to see a book like this offered for $45.00. Yale University Press deserves our gratitude.

This book is absolutely essential for any ethnobiologist with interests in Indonesia or neighboring areas. It should also be on the shelf of anyone with an interest in marine ethnozoology.

Now if only we can prevail on Dr. Beekman to translate the botany…

E. N. Anderson
Department of Anthropology
University of California
Riverside, CA 92521-0418

Journal of Ethnobiology 19(2): 261-276 Winter 1999

THE PROCESS AND SOCIOCULTURAL SIGNIFICANCE OF GOPHER TRAPPING IN A MODERN YUCATEC MAYA COMMUNITY

KEVIN HOVEY
Department of Anthropology
University of California, Riverside
Riverside, CA 92521-0418

DOMINIQUE RISSOLO
Department of Anthropology
University of California, Riverside
Riverside, CA 92521-0418

ABSTRACT.– Pre-Hispanic and early Spanish texts document animal trapping in the Maya area. Snare traps are used by the modern Maya of the Yucatán peninsula to capture hispid pocket gophers (*Orthogeomys hispidus* Le Conte) for human consumption. We describe gopher trapping in the Maya community of Naranjal, Quintana Roo, México, and provide detailed information on the selection of suitable trap locations, construction of traditional snare traps, and preparation of gophers for consumption. An anthropological analysis of trapping behavior reveals new insights into the social function of gopher trapping and the role of trappers in their community.

Key Words: Maya, Quintana Roo, Mexico, gopher, snare trap

RESUMEN.– El atrapar animales en la región Maya está documentado en textos prehispánicos así como coloniales tempranos. Las trampas de lazada son utilizadas por los Mayas contemporaneos de la península de Yucatán para capturar tuzas (*Orthogeomys hispidus* Le Conte) para consumo. Observaciones etnográficas del atrapado de tuzas en la comunidad Maya de Naranjal, Quintana Roo, México, proveén información detallada sobre la selección de lugares apropiados para las trampas, la construcción de trampas tradicionales, y la preparación de las tuzas para consumo. Un análisis antropológico del comportamiento asociado con el atrapar provée nuevos entendimientos sobre la función social del atrapar tuzas y el papel de los atrapadores en su comunidad.

RÉSUMÉ.–Le piègeage d'animaux dans la région Maya est documenté dans de nombreux textes pré-hispaniques ainsi que dans de plus récents. Aujourd'hui, les collets sont utilisés par les Mayas du Yucatán pour capturer les taupes de poche (*Orthogeomys hispidus* Le Conte) à des fins alimentaires. Les observations ethnographiques du piégreage de taupes dans la communauté Maya du Naranjal, Quintana Roo, México, fournissent des informations détaillées sur les locations de piégeage les plus aptes, sur le façonnage des collets traditionnels, et sur la préparation alimentaire des taupes. Une analyse anthropologique sur cette coutume de piègeage và révèler de nouveaux aperçus sur la fonction sociale du piègeage de taupes et le rôle de ces trappeurs dans leur communauté.

INTRODUCTION

Prehistoric and Historic Use of Animal Traps in the Maya Region.– Generic trapping activities among the Maya have been known for some time. Two of the oldest documented examples are provided by the indigenous, pre-Hispanic Maya document the codex *Tro-Cortesianus* or *Madrid Codex* (Anders 1967) and Fry Diego de Landa's sixteenth century *Relación de las Cosas de Yucatan.* As the early twentieth century Maya scholar Alfred Tozzer correctly pointed out (Tozzer and Allen 1910, Tozzer 1941), the *Tro-Cortesianus* is rife with examples of animal trapping (Figure 1). Indeed, the *Tro-Cortesianus* clearly demonstrates that the pre-contact Maya took both large and small game with traps (see also José Luis Franco C 1960, J. Salvador Flores 1984). Moreover, the *Tro-Cortesianus* provides strong evidence that the pre-contact Maya trapped animals using a technology that is still employed to this day. For example, the bent position evinced by all of the trap trees shown in the *Tro-Cortesianus*, in combination with the use of a snaring rope or cord, implies that the trees functioned as trap springs (see Figure 1).

Compared to the Maya document, Landa's descriptions of the snare traps are anything but detailed. In fact, they are mentioned only twice and then only in passing. He wrote:

> [t]hese tribes [the Maya] lived so peaceably that they had no quarrels nor did they make use of arms, nor bows even for hunting, although today they are excellent archers, and they only used traps and snares, by means of which they took a great deal of game [Tozzer 1941:31]

and

> [b]esides the fish whose abode is the water...there are many iguanas...There are so many of them that they help every one in Lent, and the Indians fish for them with slip knots fastened up in the trees and in their holes [Tozzer 1941:191].

In addition to snare traps, Landa also mentioned gophers; "[t]here are many very pretty squirrels, and moles and weasels and mice" (Tozzer 1941:205). In his translation, Tozzer noted that "[t]here are no moles in this country, but the early Spaniards so designated an animal now called *tuza*, in Maya *ba*. It is a pocket-gopher..." (Tozzer 1941:205).

Landa's reference to snare traps and gophers is important since his documentation provides a link between the pre-Hispanic and contemporary Maya. The practice of using snare traps to catch other animals and the fact that gophers are rarely seen above ground, suggests that Landa observed gophers only after they were trapped. Therefore it seems apparent that trapping gophers with snare traps has been continually practiced by the Maya at least since the Late Postclassic era (AD 1250-1521).

Archaeologically, evidence for the prehistoric practice of gopher trapping is almost entirely lacking; given the organic nature of the trap and the small size of gophers, this comes as no surprise. H. E. D. Pollock's and Clayton E. Ray's investigations at Mayapan, Yucatán, México do, however, allow some hypothesizing in

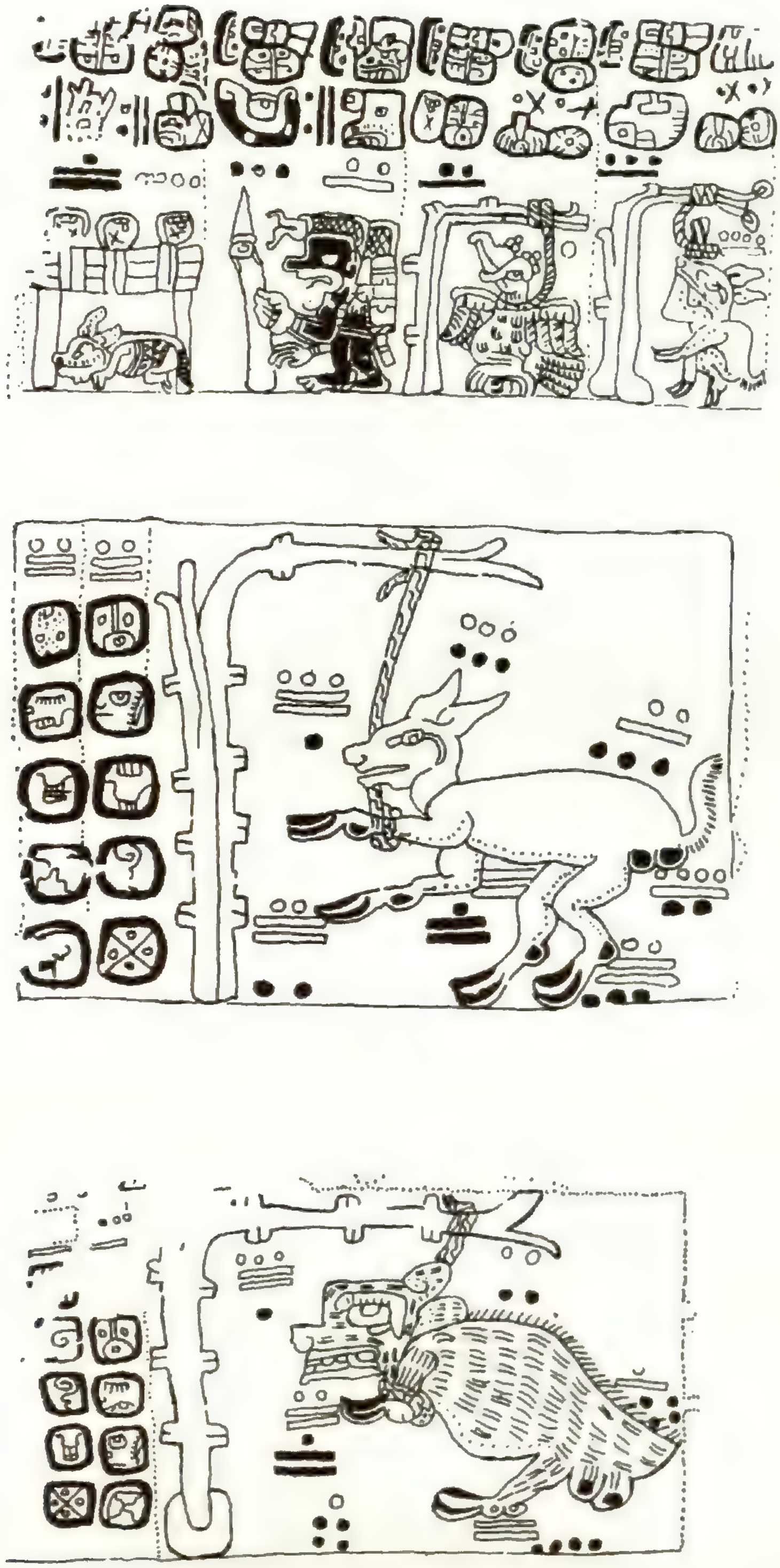


FIGURE 1.– Pre-Hispanic Maya Depictions of Animal Trapping. (A) Page XCIa of the *Tro-Cortesianus*. Villacorta and Villacorta (1976:407) suggest that the animals depicted here (from left to right) include a peccary, a turkey, and a paca (after Villacorta and Villacorta 1976:406). (B) Page XLVb of the *Tro-Cortesianus*. Deer caught in a snare trap (after Villacorta and Villacorta 1976:314). (C) Page XLIXa of the *Tro-Cortesianus*. Villacorta and Villacorta (1976:323) suggest that the animal depicted here might be a peccary or a tapir (after Villacorta and Villacorta 1976:322).

this regard. In their report, Pollock and Ray (1957:633-656) reported that gopher remains were recovered from two separate tomb contexts. In the first, a gopher tooth was recovered from a tomb that contained four human (three adult, one infant) burials as well as the remains of three opossums. In the second, a gopher jaw was recovered from a tomb that contained the remains of two humans (both adult). Although we agree with Pollock and Ray's pessimistic assessments of the evidentiary value of the tooth and jaw (the tombs were not sealed contexts), their presence nevertheless suggests that gophers might have been trapped, killed, and then placed into burial contexts by the inhabitants of that Postclassic northern Yucatán Maya capital.

Contemporary Research.– Contemporary gopher trapping in México is described by José Luis Franco C. in his 1960 article *Una trampa nueva del Valle de México*. His article describes and provides a sketch of a trap that embedded a multi-pronged spear into a gopher when the gopher attempted to plug the entrance of its burrow. A similar type of trap was mentioned but not described by Walker *et al*. (1964) in *Mammals of the World*.

Contemporary Maya gopher trapping was described by botanist J. Salvador Flores in his 1984 book *Algunas Formas de Caza y Pesca Usadas en Mesoamerica*. This important work provides illustrations and detailed descriptions of various Mesoamerican hunting and fishing techniques. Flores describes two types of gopher traps. The first (this trap is similar to the trap mentioned above by Franco 1960 and Walker *et al*. 1964) functioned by embedding a spike into a gopher after it had chewed through a root that held the spike in a ready position (Flores 1984: Figura 25A, 25B). The second functioned by trapping a gopher in a snare connected to a small tree or sapling (Flores 1984: Figura 25).

In his book *Tzeltal Folk Zoology* (1977), Eugene S. Hunn provides an impressive inventory of animal traps used by this highland Maya group. His informative descriptions, which include native trapping terminology, are accompanied by detailed illustrations. Two gopher snare traps, which are quite similar to one another, are described by Hunn (ibid:114, Figure 4.14) and appear to be functionally related to both the latter trap mentioned by Flores and the traps we observed in Naranjal. While both of the traps Hunn describes make use of a spring (such as a small tree or pole), a snare, and a tension line, the first trap is set into motion after the gopher disturbs a stick to which the tension line is attached. The second snare trap is activated when the gopher eats through a baited tension line.

Flores' and Hunn's informative examples of Maya gopher snare traps provide a foundation from which certain aspects of regional traps and trapping behavior can be explored. In order to provide a more detailed account of the entire process of gopher trapping, as well as interpret the significance of this activity, we followed a group of boys as they went about their trapping routine. In this study, we will describe how gopher snare traps are made, what materials are used, how the gopher meal is prepared, and the sociocultural context of trapping in a modern Yucatec Maya community.

GOPHER TRAPPING IN THE MODERN MAYA COMMUNITY OF NARANJAL

The Community of Naranjal, Quintana Roo, México.– Naranjal (Figure 2) is a small Yucatec Maya village located 10 km to the south-southeast of Ignacio Zaragosa, a town situated on Carreterra Principal 180, the main toll-free road linking the east and west coasts of the Yucatán Peninsula (Fedick and Taube 1995). Established sometime in the early 1950's, the modern community sits atop an ancient Maya center known as Tumben-Naranjal. Naranjal is surrounded by a dense semi-deciduous tropical forest abundant in both secondary and primary growth species. Naranjal is also bordered by a 500 ha wetland (Fedick and Taube 1995). The people of Naranjal are subsistence farmers, who supplement their livelihoods by harvest-

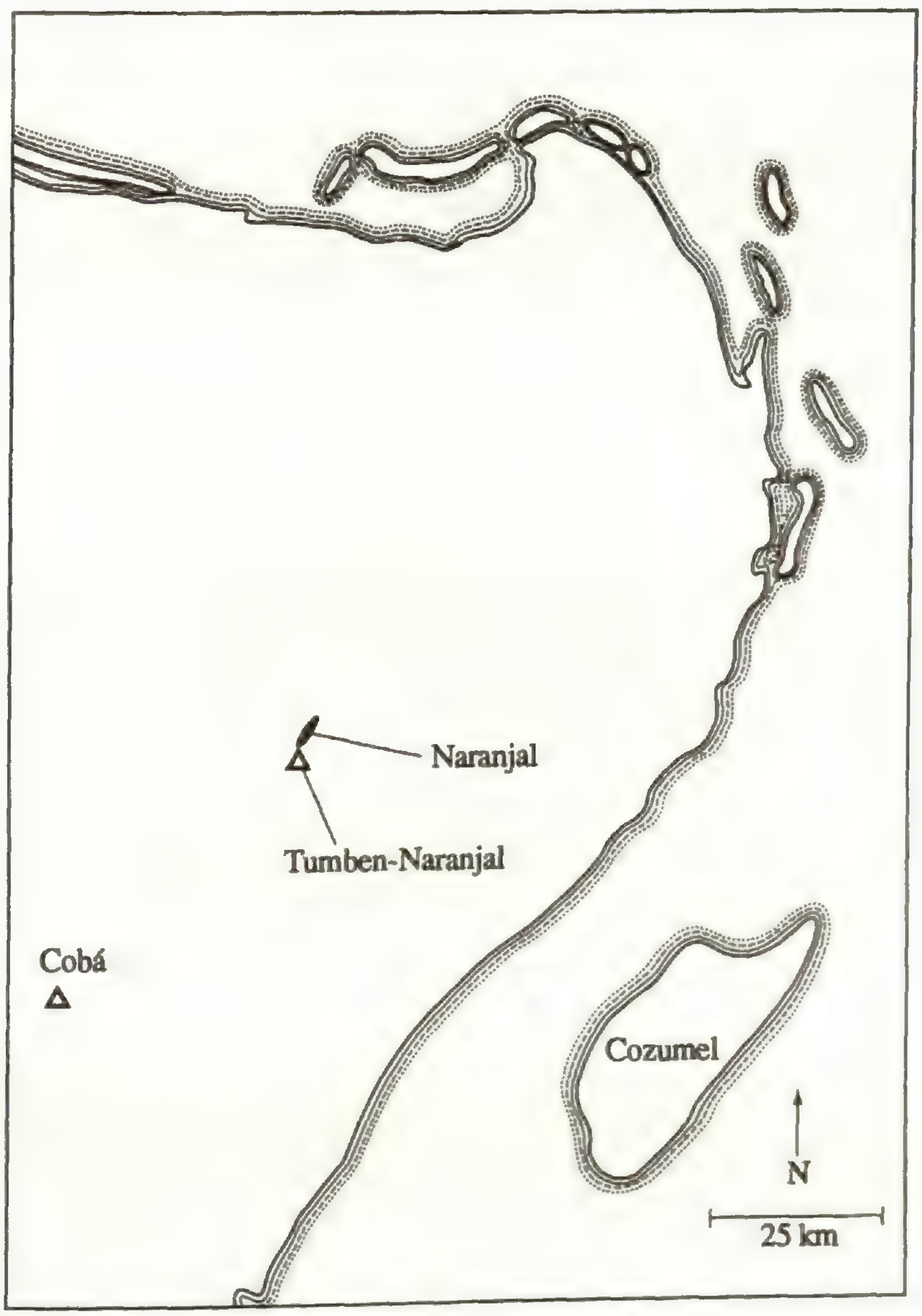


FIGURE 2.– The Northeastern Portion of the Yucatán Peninsula and the Location of Naranjal.

ing and selling honey and producing charcoal for sale at local and regional markets. The community consists of fourteen families (Goldsmith-Jilote 1995) and is in every way a contemporarily traditional Yucatec Maya village; steeped in tradition, Naranjal embraces and struggles with modernization. Ellen Kintz captured this convoluted dichotomy when she wrote about the village of Cobá, 40 km to the southeast of Naranjal:

> [t]he village of 10 years ago was very traditional: the new village is much changed. The frontier village has been pulled into the modern world. New roads have been constructed, potable water systems have been developed, and electricity has reached the village. Still, the Maya of today retain many of their traditions, they remember many of their legends, and they continue to pass their history from the old generation to the new [Kintz 1990:xi].

The Hispid Pocket Gopher.– Gophers are solitary creatures that spend most of their time underground in their burrow systems which "are often extensive and usually marked by a series of mounds of earth" (Hall 1981:454). Gophers are not commonly seen above ground and, when spotted there, they quickly retreat. Although there is current debate concerning the correct number of genera and species that appear in México (David Hafner, written communication 1997),[1] only one species appears in the northern portions of the Yucatán Peninsula; *'tusa'* ***ba*** (*Orthogeomys hispidus* Le Conte) (Wilson and Reeder 1993). *Orthogeomys hispidus* (Figure 3), a member of subgenus *Heterogeomys* Merriam, is commonly referred to as the Hispid Pocket Gopher, and characterized by the following criteria:

> [the] [h]ead and body length is 100-350 mm and the tail length is 50-140 mm. The weightYis 500-800 grams. The fur tends to be coarse and scanty but may be softer and denser at higher elevations. The upper parts are usually dark brown or black, and the underparts are somewhat palerYThe upper incisors usually have a single median groove located toward the inner edge of the tooth, but a lingual groove also is sometimes present [Nowak 1991:622].

> Their burrows are usually shallowYand the tunnelsYreach 100 mm in diameterYMost underground activity occur[s] during daylight, and individual home range [is] about 200-270 sq metersYThe diet includes many kinds of vegetable matter [Nowak 1991:622-623].

Orthogeomys hispidus are formidable garden and crop pests and have the capacity to cause significant damage (Nowak 1991). To control this problem Nowak (1991) and Walker *et al.* (1964) report that professional *'tuceros'*, adult male gopher hunters who are paid per tail, are sometimes hired by a community or family to catch and kill the pests. In these cases "traps, snares, spears, and slingshots" are used (Nowak 1991:623). As one sees below, however, this is not the case at Naranjal.

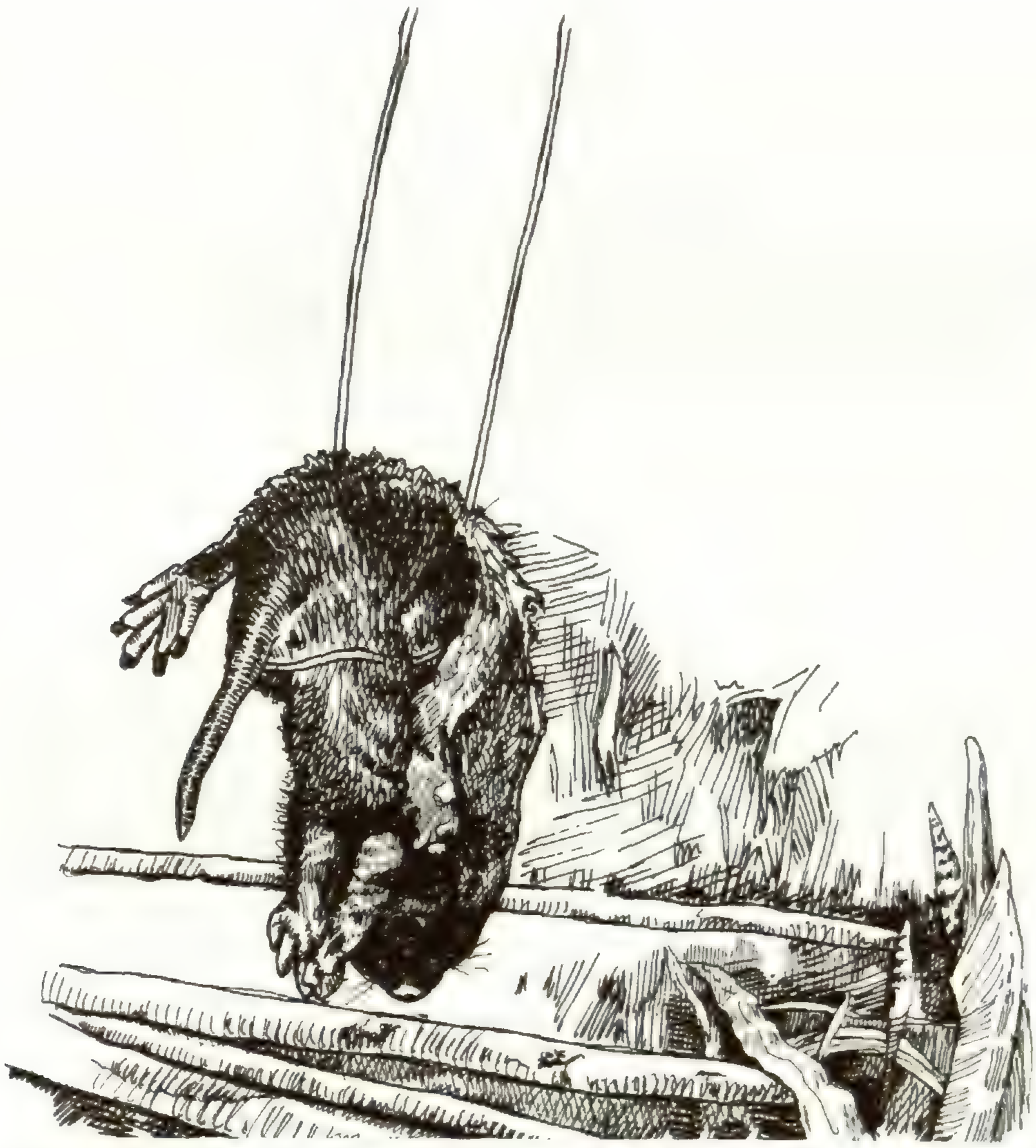


FIGURE 3.– Hispid Pocket Gopher (*Orthogeomys hispidus* Le Conte) being Removed from Snare Trap. Note the wire snare about its mid-section (drawing by Charles Bouscaren).

The Anthropology of Gopher Trapping at Naranjal.– Gopher trapping is an activity that is limited to the young boys, ages seven to sixteen, of the Naranjal community. Sometimes, a very young boy, the younger brother of one of the trappers, will accompany the trapping expedition. However, they do not participate in trap construction. Only once did we observe a grown man returning from the forest with a gopher.

Gopher trapping has a number of intertwined functions. Most significantly, it introduces and incorporates the boys into the familial and communal realm; further, it affords them the opportunity to expand their knowledge of the natural world (Kintz 1990). Spending long periods of time in the forest and *milpa*, learning and understanding the forest, hunting, "contribut[ing] the bulk of the economic resources [to the family]" (Kintz 1990:30), and supervising the culinary preparation of their game are all male tasks. The trapping activity, as mundane as it appears, teaches the boys that they are productive members of their families and community. In addition, the boys form important bonds during these outings, bonds that will influence their future "social success, economic success, and/or political success" (Kintz 1990:14).

Practically speaking, most of the young boys who trap gophers are too young to help their fathers and older brothers in the family *milpa*. Therefore, the trapping activity gets the boys out of the house, out of the way of their mothers, and into the forest, where they engage in an activity that benefits themselves, their family, and their community. Even though gopher trapping may be boys' work, it is nevertheless important. The gophers that the boys trap are sometimes the only meat that a family receives for several days.

DESCRIPTION OF THE GOPHER TRAPPING PROCESS

Locating Active Burrows.– During the summer months (June, July, and August) and very early in the morning (approximately two to three hours before the sun rises) small groups of four to six boys leave Naranjal for the forest that surrounds the fringes of their community. Gopher trapping does occur during other parts of the year, but the summer months see the most activity. Armed with small flashlights, they venture into the secondary forest surrounding Naranjal to search for areas of gopher activity. Much joking, wrestling, and boyhood antics occur during these outings and the boys truly revel in their roles as trappers of a valuable food source. These trapping expeditions, which are typically three to four hours in duration and involve treks of up to two kilometers, are completed when the boys return to Naranjal with the gophers that were snared by the traps set during the previous morning.

When the boys are satisfied that they are in a portion of the forest or *milpa* that evinces the telltale signs of gopher activity, the group splits into small crews comprised of one or two boys and the trapping activity begins.

Once a boy happens upon an area of gopher activity, he must determine which of the many soil mounds represents the most recent burrowing activity. This is vital since placing a trap at the entrance to an abandoned or old burrow decreases the chances of snaring a rodent. The boy takes a large handful of soil from each of the many mounds and judges which has the soil with the most moisture; the freshest mound has the highest level of soil moisture. Customarily, the boy locates the appropriate mound within one to two minutes.

When the boy is satisfied with his choice, he denudes the mound area of the surrounding forest scrub with his steel machete. Then, and with his hands, he removes the mound and the soil that blocks the burrow's entrance and the deeper portions, the first 40 to 50 cm, of the burrow (this soil is referred to as the "plug" in the biological literature [Hall 1981:455]). This latter distance roughly equals the length of the trapper's forearm and, beyond this distance, the burrow is free of soil.

Constructing the Trap.– After the burrow is opened, the boy selects what will be the trap's spring, a young sapling (Figure 4A). A suitable sapling must possess several criteria: (1) it must be a living or freshly cut ***puuts' mukuy*** (*Xylosma anisophyllum* Standley);[2] dead sections of ***puuts' mukuy*** or other types of saplings are not appropriate as they lack the appropriate flexibility and strength, *'la fuerza,'* that the ***puuts' mukuy*** possess; (2) the sapling must be located or placed behind the entrance to the burrow– this placement is necessary since the spring sapling must

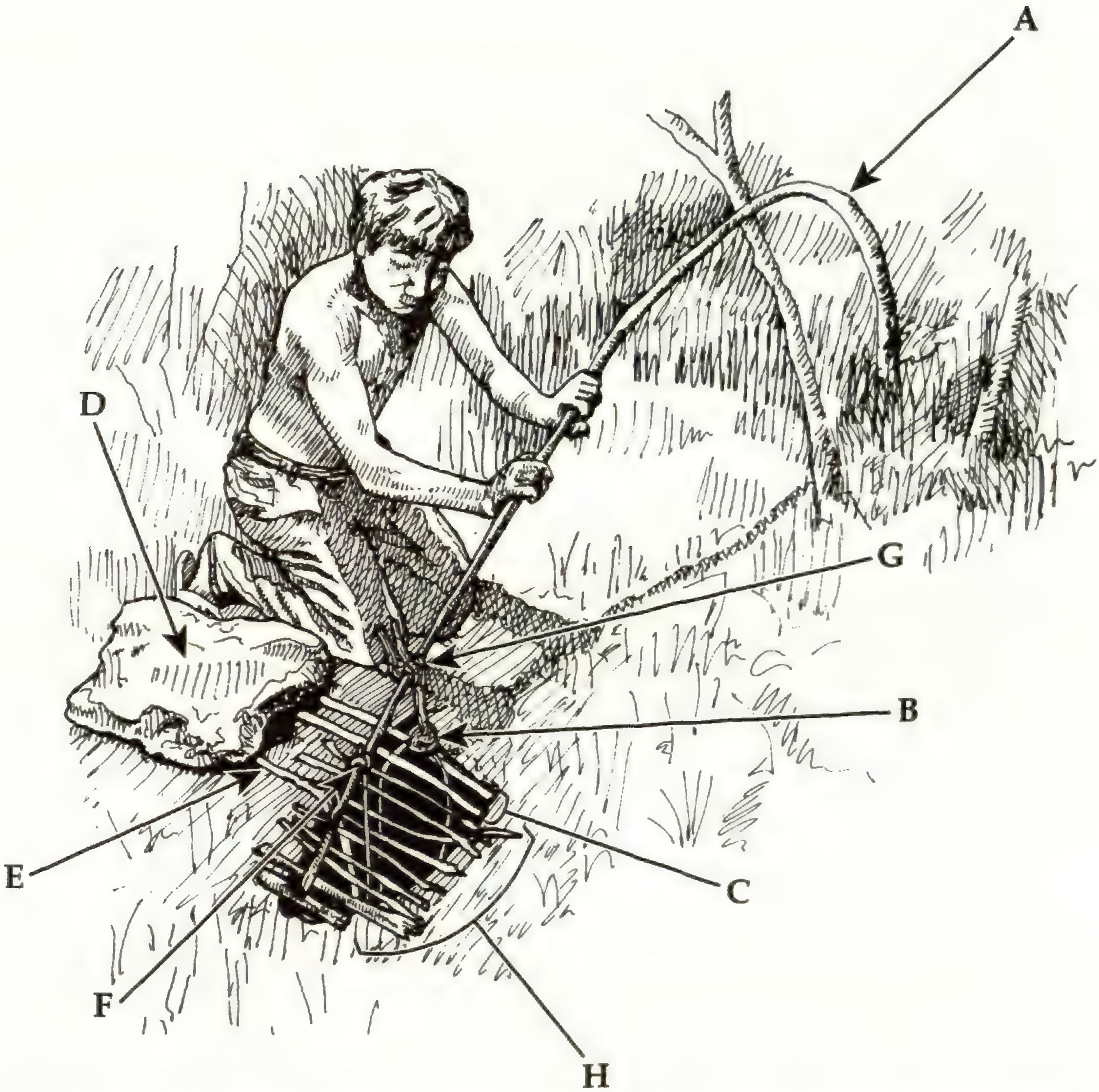


FIGURE 4.– View of the gopher snare trap before a covering of leaves and soil is applied. The fundamental components of the trap include: (A) the spring sapling, (B) the bark strip attached to the wire snare, (C) the two parallel shafts which are embedded into the sidewall and flank the snare, (D) The stone used to anchor the free ends of the parallel shafts and the bait vine shaft, (E) the shaft that anchors the bait vine to the floor of the borrow, (F) the bait vine attached to the spring sapling, and (G) the bark strip attached to the spring sapling. From this perspective, the gopher will approach the trap from the upper right-hand corner of the illustration (drawing by Charles Bouscaren).

pull the gopher in a direction parallel to and back from the entrance to the burrow; (3) the trunk should be equal in size to the circle the boy can make by pinching, into a circular shape, the tips of his thumb and forefinger– a sapling of this girth has the flexibility needed to withstand long periods of time under tension yet spring into a vertical position when it is released from this tension; and (4) it must be long enough to extend a distance equal to 60 cm beyond the entrance to the burrow– this is necessary as the remaining parts of the trap are tied to this distal

portion of the spring sapling. Finding a sapling such as the one described is generally not a problem as the secondary growth forest around Naranjal abounds with the appropriate flora.

Once a boy chooses a ***puuts' mukuy***, he clears away the scrub that lies between the sapling and the entrance to the burrow and then strips (the leaves and branches) and crops the sapling to the appropriate length. If a ***puuts' mukuy*** sapling is not growing in the appropriate position behind the entrance to the burrow, the boy locates and fells a ***puuts' mukuy*** sapling and manually inserts it into the ground in the appropriate location. He then anchors and immobilizes the base of the spring sapling by placing large rocks against and around its lower portion. He then gives the sapling a flexibility and strength test; in repeated events, it is bent over the entrance to the burrow, pinned to the ground, and then released in order to assess if the sapling is suitable. If the sapling withstands this treatment, the boy continues with the construction process.

Next, the boy locates and fells another ***puuts' mukuy*** sapling with a diameter equal to that of the spring sapling. He cuts the felled sapling into a 2.0 m length, smashes it against a rock with the handle of his machete, and, in one continuous 2.0 m segment, he strips it of its bark. He then ties the 2.0 m strip of bark to a premade snare. Contemporarily, this snare is made of wire. We asked if a sturdy vine or flexible twig could be substituted. The reply was, "we use wire."

The wire snare has been pre-shaped by the boy into an elongated oval with a major axis of approximately 30 cm and a minor axis of approximately 10 cm. The ends of the snare have been wound together tightly to ensure that the snare does not pull apart when directional force is applied. The boy ties the strip of bark that he removed from the ***puuts' mukuy*** sapling to the snare where its ends have been wound together (Figure 4B).

Once this step is accomplished, the boy then turns his attention back to the entrance of the burrow. He cleans the area of roots and compost, and slightly widens the exposed entrance to a depth equal to the length of his forearm. The boy then extends the entrance to the burrow, in a forward direction, a distance of approximately 50 to 60 cm. This provides the boy with a working area.

Next, the boy looks for yet another ***puuts' mukuy*** sapling with a diameter equal to that of the previous two. He fells the sapling and cuts it into two equal 1.2 m lengths. He then spikes one end of each of the two lengths with his machete. Then, at the junction to the rodent's entrance and the boy's artificially constructed frontal expansion, he places the spiked end of one of the shafts approximately 7 cm below the ground's surface and, at a slightly downward angle, inserts the shaft a distance of approximately 23 cm into the burrow's sidewall. He then bends the free end of the shaft to the ground to ascertain if the embedded end remains anchored when the free end is under force. If it remains embedded, he inserts the second shaft into the sidewall slightly divergent and adjacent to the first shaft. He then tests the second shaft as he did the first. The boy leaves a small gap (equal to three to four times the diameter of the wire used for the snare) between the two shafts (Figure 4C). When this step is completed, the shafts are (1) roughly parallel to one another as they leave the burrow sidewall, (2) perpendicular to the burrow, and (3) separated by a distance equal to 5 cm at their free ends. The boy anchors

their free ends to the ground by placing a large, 10 to 15 kg rock on top of them (Figure 4D).

Next, the boy inserts the metal snare through the gap he left between the two parallel shafts. The part of the snare that is tied to the length of ***puuts' mukuy*** bark and one third to one half of the wire snare is left protruding above the two parallel shafts. The boy then form fits the snare to the burrow's shape, pushes it a short distance into the burrow's walls and floor, and disguises it with a thin covering of the soil he had removed from the interior of the burrow. He then places the long strip of ***puuts' mukuy*** bark where it is out of his way and continues with the construction process.

The precise location for the bait to be placed in front of the wire snare is carefully selected. This placement ensures that the body of the gopher will be bisected by the wire when the trap is triggered. The boy determines this distance by placing a dead twig (he uses whatever dead forest vegetation happens to be within his reach) in his hand, palm up, and breaking it into a length which equals the distance between the outside edge of the first knuckle of his thumb and the outside edge of the opposite side of his palm. We were informed that this distance equals one half of a gopher. This twig is called *'la medida'* or 'the measure.' Much care is taken when the measure is made and the boy might break several twigs until one with the appropriate length is made. When he is satisfied that he has a twig with the correct length, he lies it on the burrow floor perpendicular to and in front of the snare. It is imperative that one end of the measure abuts the snare since the bait will be placed in front of the snare a distance equal to the length of the measure.

The crux of this trap is the bait; it lures the gopher into the wire snare and once it has been consumed, sets the spring sapling into motion (the bait vine is shown attached to the spring in Figure 4F). Its use is ingenious. Cognizant that the gopher is fond of eating a particular vine ***x-tabentun*** (*Turbina corymbosa* (L.) Raf.) (in its absence ***ek' kix*** *Cydista aff. potosina* [K. Schum & Loes] Loes is used), the boy uses it to lure the gopher to the snare area. The ***x-tabentun*** vine is found clinging to the trees and bushes of the forest and the boy quickly locates and then cuts a 1.2 m length from the tangle. He then fells another ***puuts' mukuy*** sapling with his machete and makes another spiked shaft. This shaft will function as the anchor that moors the spring sapling, vis-à-vis the bait vine (***x-tabentun***), in its bowed and ready position over the entrance to the burrow.

In its natural state, the vine is an unsuitable bait. It has a bark that, according to the trappers, the gopher finds unappealing. To make the vine appetizing, the boy twists it twice through its length. This stresses and cracks the bark thus exposing the succulent, inner woody parts of the vine. The twisting, as compared to stripping, is employed since the vine's strength is compromised when its bark is removed. Then, in a multi-step process, the boy attaches the vine to the spiked end of the anchor shaft: first, the boy holds in place one end of the vine approximately 18 cm from the spiked end of the shaft; second, and keeping the vine aligned along the long axis of the shaft, the boy strings the vine towards the spiked end of the shaft; third, the boy bends the vine under the spiked end of the shaft; and fourth, he winds the vine back up the shaft thus clamping the aligned portion of

the vine to the shaft. The wound vine is tightly spaced near the spiked end of the shaft but becomes widely spaced as it approaches, and then passes, the end of the vine which was first set in place 18 cm from the spiked end of the shaft. Seven to nine wrappings of the vine around the shaft ensures that the vine is properly clamped.

Once the vine is wrapped around the shaft, the boy inserts the spiked end of the shaft into the floor of the burrow at the end of the measure. The boy then discards the measure. The anchor shaft is inserted 30 cm into the ground to ensure that the vine is well secured by it. The boy snaps, but does not break, the anchor shaft where it bisects the plane created by the surface of the ground. He then places the shaft's free end under the rock that was placed over the two slightly divergent shafts (Figure 4E). He then unwinds the loose end of the vine from the upper portions of the anchor shaft so that as it penetrates the burrow floor, it does not contact the anchor shaft. This leaves a 76 cm length of the vine protruding from the burrow floor. The boy then checks the anchor by tugging slightly on the vine. If the vine withstands the tugging, the boy continues with the construction.

Next, the boy pulls the spring sapling towards the ground and moors it into a ready position with the vine (Figure 4F). He then gingerly releases the sapling to establish that the vine, and its subterranean anchor, can withstand the tension of the tethered sapling. If the sapling remains moored, the boy ties the free end of the ***puuts' mukuy*** bark strip to the spring sapling a short distance from where the ***x-tabentun*** vine was tied (Figure 4G). The slack is removed from the strip before it is tied to the sapling but not so much that it tugs on the wire snare when it is connected, vis-à-vis the bark strip, to the sapling. The trap is now set. However, the boy still needs to disguise the trap's presence. This he does by restoring the burrow's natural appearance.

The boy first locates and then cuts down a ***k'o'och*** (*Cecropia pelata* L.) sapling and cuts it into small 30 cm sections. This species, rather than the ***puuts' mukuy***, is employed since it is lighter and easier to cut than the latter. Once the sections are cut, the boy places them perpendicular to and over the top of his artificially constructed frontal expansion (Figure 4H). The small ***k'o'och*** sections are closely spaced and have an average distance of approximately 2 cm between them. (Refer to Figure 4 for an illustration of a trap at this stage of completion). Over the sections of ***k'o'och***, the boy places large, freshly picked leaves from ***taas ta'abil*** (*Guettarda combsii* Urban). The leaves function as a roof and they also keep soil from falling into the trap. On top of the leaves a liberal pile of soil and forest debris is applied and modeled until the burrow is completely buried and a mound shape is obtained. The trap is now complete and the boy leaves it until the early morning hours of the next day.

With his first trap set, the boy then searches the jungle floor for other areas of gopher activity. By the time the boys are ready to return to Naranjal, each crew will have set an average of two to four traps and have checked the traps they had set the previous day. This completes the description of how the trap is made; what follows is a description of how the trap works.

How the Trap Works.– When the gopher attempts to leave its burrow that night, it

encounters the ***x-tabentun*** vine at the entrance to its burrow. The gopher advances upon the vine and begins to eat it. Since the bait vine was placed a distance equal to one half of the gopher's length beyond the wire snare, the wire snare is poised directly below the midsection of the gopher as it consumes the vine. When the vine is chewed past its breaking point by the gopher, the spring sapling is released from tension and it rapidly whips into an upright position; recall that the wire snare was not anchored to the burrow floor; it was only disguised. As the sapling rights itself, the gopher is jerked upwards and backwards by the wire snare as the potential energy of the spring sapling is released and acts upon the ensnared rodent. This upwards and backwards movement is abruptly halted when the gopher encounters the two parallel shafts which lie perpendicular to the burrow and now, its spinal column. Upon hitting these shafts, the gopher's back is broken (thus paralyzing the rodent) and it becomes trapped under the shafts by the tension produced by the spring sapling that continues to pull on the ensnared gopher via the strip of ***puuts' mukuy*** bark. Here the gopher remains, often alive, under ground, safe from predators or scavengers, until the boy returns the next morning to check his trap. (See Figure 3 for an illustration of the gopher being removed from the trap). As a whole, the group typically returns to Naranjal with four to six gophers.

Preparation and Consumption of the Gopher.-- Directly after the gopher is removed from the trap and brought home, it is prepared for consumption by the boy or boys who trapped it and shared with the family. First, a small ***piib*** or cooking pit (measuring 20 cm by 30 cm wide, and 10 cm deep) is dug in the backyard of their house. Though the females of Naranjal are often in charge of food preparation and cooking activities, the males typically construct and control the ***piib***. These outdoor pit ovens are traditionally used for cooking pork, chicken, bread, and as we document here, gophers. After the shallow ***piib*** is excavated, it is filled with a few coals from the household hearth. Next, the boy locates and collects twigs from the surrounding area. Although the boy is not interested in species, he is interested in selecting twigs that are somewhat dry yet moist enough to smolder once they are placed atop hot coals. This moisture is necessary since the twigs must smolder and burn to coal, not ash. The twigs are laid closely together over the coals and small stones are placed atop the smoldering wood. As the ***piib*** heats, the gopher is placed whole on top of the rocks and turned frequently. This process burns-off the rodent's hair. When it is apparent that the hair has been sufficiently charred, the gopher is removed from the stones and carefully shaved with a small knife. The gopher is then placed on the rocks once again, removed, and then rinsed in a bucket of water. This latter process removes any remaining burnt hairs or debris.

When the twigs in the ***piib*** have been reduced to coals, the gopher is placed directly atop the coals while the hot rocks are pushed around and over it. The ***piib*** is then covered with freshly picked ***piixoy***[3] leaves and then soil. The gopher is then left to cook in the ***piib*** for 15 to 20 minutes.

After the gopher is removed from the ***piib*** it is placed whole on a plate and then brought inside to the boy's mother. The mother opens the gopher's chest cavity and removes its innards. These are then placed in a wooden bowl containing lime juice and mashed with a pestle into a dark green paste. (According to David Hafner [personal communication 1997], the gopher's innards contain veg-

etable matter that provides additional nutrients for the consumer of the gopher). Small amounts of this intestinal paste are scooped-up with a corn tortilla and eaten with habanero chile ***ik*** (*Capsicum frutescens* L.) and salt. The meat of the gopher is pulled off with portions of corn tortilla and is also consumed with ***ik*** and salt. According to Rissolo, the meat is tender and mild in flavor and more enjoyable to eat than the intestinal paste. As much of the gopher is consumed as possible, including the skin and the fleshy parts of the skull but not the brain. Little is left after the meal except for the vertebrae and long bones. The remains are tossed into the backyard and quickly dispatched by the numerous scavenging dogs typical in Naranjal.

CONCLUSION

The purpose of gopher trapping in the community of Naranjal is essentially two-fold. Fundamentally, it provides a valuable food resource for the trapper's family, but perhaps most importantly, it functions as a productive mode of socialization for boys in the community. During our outings, we observed how the trapping process encourages the boys to learn, improve, apply, and teach specific skills. These include the ability to navigate in the forest, the ability to locate, identify, and describe the characteristics of various plants, and the ability to function as a member of a team. It may seem that the small size of a gopher does not justify the amount of time necessary to construct a trap, monitor the trap site, and prepare the catch. However, the social and practical skills that the boys acquire in the process prepare them for the more economically, politically, and socially significant roles that they are sure to assume as young men.

Finally, our observations of the process of gopher trapping in Naranjal reveal the degree of continuity between the type of animal traps illustrated and described in ancient Maya texts and historic accounts, and those currently used in contemporary Maya communities. Details of trap construction and trapping behavior contribute to our knowledge and understanding of the living Maya and their forest. Moreover, this example of Maya trapping technology illustrates the "remarkable consistency and conservatism" of not only "Maya ritual over time" but of seemingly mundane aspects of Maya daily life (Love 1989:336).

NOTES

[1] According to Hafner, there are six genera and 14 species of gopher in Mexico. This is in contrast to Wilson and Reeder (1993) who state that there are five genera and 18 species.

[2] We recorded the Yucatec Maya plant names in the field and they appear here in the modern orthography (see Barrera Vásquez, ed. 1980). Although the Maya plant names included in this study were verified by *Lista Florística y Sinonimia Maya* (Sosa *et al.* 1985), it is important to note that they are subject to regional variation. Plant specimens were collected by the authors in the field and identified by Dr. Arturo Gómez-Pompa and *M. en C.* Luz Maria Ortega at the Reserva Ecologica El Éden office in Cancun, Quintana Roo, Mexico. No voucher specimens were collected.

[3]The authors were not able to collect a sample of the plant used to cover the ***piib***. The Maya informed the authors that it was ***piixoy***, which is possibly *Guazuma ulmifolia* Lam.

ACKNOWLEDGMENTS

Numerous academic colleagues and Maya consultants helped in the preparation of this article and a common quality united them: unrestrained and enthusiastic assistance. Specifically, Dr. Arturo Gómez-Pompa from the University of California, Riverside/Reserva Ecologica El Éden and *M. en* C. Luz Maria Ortega also from the Reserva Ecologica El Éden provided the plant identifications. Additional plant identifications and technical assistance were supplied by Gillian Schultz from the University of California, Riverside. Dr. David J. Hafner provided valuable biological data on the family Geomyidae. Gopher trappers José Cupul May, Venancio Cupul May, and Antonio Dzul Caamal were gracious with their time, patience, and knowledge and the Cupul family with their hospitality. Special thanks go to Dr. Scott L. Fedick, director of the Yalahau Regional Human Ecology Project, Biol. Marco A. Lazcano-Barrero, director of Reserva Ecológica El Éden, the Anders Foundation, *Lic.* Gastón Alegre López, Charles Bouscaren, Jaime Muldoon, James Short, and Laurent Canalejas.

LITERATURE CITED

ANDERS, F. 1967. Codex Tro-Cortesianus. Akademische Druck-u Verlagsanstalt, Graz.Distributed in the US and Canada by Frederick A. Praeger, New York.

BARRERA VÁSQUEZ, ALFREDO (editor). 1980. Diccionario Maya Cordemex: Maya-Español, Español-Maya. Ediciones Cordemex, Mérida.

FEDICK, SCOTT L. and KARL A. TAUBE. 1995. The Yalahau regional human ecology project: research orientation and overview of 1993 investigations. Pp. 1-21 *in* The View from Yalahau: 1993 Archaeological Investigations in Northern Quintana Roo, Mexico, Scott L. Fedick and Karl A. Taube (editors). Latin American Studies Program, Field Report Series, No. 2, University of California, Riverside.

FLORES, J. SALVADOR. 1984. Algunas Formas de Caza y Pesca Usadas en Mesoamerica. Instituto Nacional de Investigaciones sobre Recursos Bióticos 16, Xalapa, México.

FRANCO, JOSE LUIS C. 1960. Una trampa nueva del Valle de México. Boletin del Centro de Investigaciones de México 6:1-4, México, D.F.

GOLDSMITH-JILOTE, KIM C. 1995. The development for tourism of the archaeological site of Naranjal: a people's perspective. Pp. 149-151 *in* The View from Yalahau: 1993 Archaeological Investigations in Northern Quintana Roo, Mexico, Scott L. Fedick and Karl A. Taube (editors). Latin American Studies Program, Field Report Series, No. 2, University of California, Riverside.

HALL, E. R. 1981. The Mammals of North America. Second ed. John Wiley and Sons, New York.

HUNN, EUGENE S. 1977 Tzeltal Folk Zoology: The Classification of Discontinuities in Nature. Academic Press, New York.

KINTZ, ELLEN R. 1990. Life Under the Tropical Canopy: Tradition and Change Among the Yucatec Maya. Holt, Rinehart and Winston, Inc., Fort Worth.

LOVE, BRUCE. 1989. Yucatec sacred breads through time. Pp. 336-350 *in* Word and Image in Maya Culture: Explorations in Language, Writing, and Representation, William F. Hanks and Don S. Rice (editors). University of Utah Press, Salt Lake City.

NOWAK, RONALD M. (editor). 1991. Walker's Mammals of the World. Volume 1, Fifth ed. The Johns Hopkins University Press, Baltimore and London.

POLLOCK, H.E.D and CLAYTON E. RAY. 1957. Notes on the vertebrate animal remains from Mayapan. Current Reports, Carnegie Institution of Washington, Department of Archaeology 41:633-656.

SOSA, VICTORIA, J. SALVADOR FLORES, V. RICO-GRAY, RAFAEL LIRA, and J.J. ORTIZ. 1985. Lista Florística y Sinonimia Maya. Etnoflora Yucatanense. Fasículo 1. INIREB, Xalapa, México.

TOZZER, ALFRED M. (editor). 1941. Landa's Relación de las Cosas de Yucatan: A Translation. Papers of the Papers of the Peabody Museum of American Archaeology and Ethnology Vol. XVIII, Harvard University, Cambridge.

TOZZER, ALFRED M. and GLOVER M. ALLEN. 1910. Animal Figures in the Maya codices. Papers of the Peabody Museum of American Archaeology and Ethnology Vol. IV. No.3, Harvard University, Cambridge.

VILLACORTA, ANTONIO J. and CARLOS A. VILLACORTA. 1976. Codíces Mayas. Tipografía Nacional, Guatemala City.

WALKER, ERNEST P., FLORENCE WARNICK, KENNETH I. LANGE, HOWARD UIBLE, SYBIL E. HAMLET, MARY A. DAVIS, and PATRICIA F. WRIGHT (editors). 1964. Mammals of the World. The Johns Hopkins Press, Baltimore.

WILSON, D.E. and D. M. REEDER. 1993. Mammal Species of the World: A Taxonomic and Geographic Reference. Second ed. Smithsonian Institution Press, Washington and London.

GENERAL INFORMATION

The *Journal of Ethnobiology* invites manuscripts based on original research in any area of ethnobiology (ethnobotany, ethnozoology) including, but not limited to: folk biological classification and nomenclature, traditional environmental knowledge, ethnoecology, indigenous natural resource management, plant and animal domestication, zooarchaeology, archaeological botany, medical and nutritional ethnobiology, and the roles of plants and animals in the intellectual, aesthetic, and spiritual lives of the world's peoples. In the material that follows, we give instructions and suggestions for manuscript preparation.

Typing and printing the manuscript. Manuscripts should be submitted both as hard copy and in digital form on a computer diskette. Hard copy should be printed on an ink jet or laser printer. Typewritten manuscripts will be accepted if the author(s) do not have access to computers. The text should be double spaced throughout (including abstracts, text, literature cited, legends, and notes) on 21.5 x 28 cm (8.5 x 11 in) paper with at least 2.5 cm (one inch) margin on all sides.

Illustrations.-The ratio of tables and figures to text pages should not exceed 1:2. All illustrations, including maps, are figures and should be numbered in the sequence in which they should appear in the text. Illustrations should be submitted reduced to a size which can be published within a Journal page without further reduction. Photographs should be black-and-white glossy prints of good contrast and sharpness with metric scales included when appropriate. All illustrations should have the author's name(s) on the back along with the figure number and a designation for the top of the figure. Legends for figures should be printed on a separate sheet at the end of the manuscript.

Tables.-Tables should complement the text. Tabular material should be relevant to the appropriate section of text but not simply repetitive of textual material. Tables should be prepared in either spreadsheet format (e.g., Excel®) or using the table functions of your word processor program. Rows and columns of information must be clearly demarcated and labeled. Use portrait or landscape orientation as needed. Adjust column widths to conserve space without loss of clarity. Each table should be printed on a separate page (or pages) and appended to the manuscript. Tables must include brief, self-explanatory titles. The image area on a *Journal* page measures approximately 20 x 12.5 cm (5 x 8 in). Take this into account in preparing tables.

Scientific names and voucher specimens.-All generic and subgeneric names must be *italicized* (underlined in typescript). Authors of all but the most familiar species of plants and animals should be cited the first time each is mentioned in the text. The locations where voucher specimens have been deposited for curation should be noted. The rationale for these requirements can be found in:

BYE, ROBERT A., JR. 1986. Voucher specimens in ethnobiological studies and publications. Journal of Ethnobiolagy 6:1-8.
REA, AMADEO M.1986. Verification and reverification. Problems in archaeofaunal studies. Journal of Ethnobiology 6:9-18.
KUHNLEIN, HARRIET V. 1986. Food sample collection for nutrient analysis in ethnobiological studies. Journal of Ethnabiology 6:19-25.
HUNN, EUGENE S.1992. The use of sound recordings as voucher specimens and stimulus materials in ethnozoological research. Journal of Ethnobiology 12:187-198.

Native language terminology.-If native terminology is used as data, a consistent phonemic orthography or practical alphabet should be employed. A brief characterization of the orthographic conventions used should be given in an endnote at the first occurrence in the text. To increase readability native terms should be indicated by *bold face italics* underlined in typescript) to contrast with normal use o£ italic type for foreign terms and Latin binomials. The distinction between lexical glosses, i.e., English language approximations of a term's referential meaning, and precise English equivalents or definitions should be indicated by enclosing glosses in single quotation marks.

Miscellaneous.-Use metric units for all measurements; English units may be added in parentheses. Do not place footnotes at the bottom of text pages; list these in order on a separate page at the end of the manuscript under the first order heading "NOTES."

Submitting the manuscript.-Submit all manuscripts to the journal Editor. Authors must submit three hard copies of their manuscript plus a digital copy on a 3.5-inch computer diskette prepared in a standard word processing format. Camera-ready figures should also be included. Copies of illustrations must be clear and suitable for review.'

ORGANIZATION

Title page.-The title page is primarily for the convenience of the editorial staff. Center the title of the manuscript in capital letters. Lower on the page center the name and affiliation and address of the first named author, then any of the coauthors. On the lower third o£ the page, give telephone numbers for at least the first-named author. Below this, give information relating to any temporary addresses (e.g. summer address, field address). The title and name(s), affiliations) and addresses) of the authors) are to be repeated on the first page of the actual manuscript as you would like them to appear in the journal.

Abstract.-With rare exceptions (e.g., a position paper) each manuscript must include an informative one paragraph abstract which briefly (i.e., in less than 200 words) summarizes the information presented in the text. The format for the abstract differs from that of the rest of the text in that the heading "ABSTRACT" is placed on a separate line flush with the left margin and is capitalized; the first line of the abstract is not indented. The abstract in English is to be followed by one in Spanish (RESUMEN) or Portuguese (RESUMO) and in French (RÉSUMÉ). Span-

ish or Portuguese and French abstracts will be edited by our editorial consultants. Examples can be found in recent volumes of the *journal*. Please list as well *five key words* that characterize the content of your manuscript for indexing purposes.

Headings.—Center first-order headings on a separate line, separated from the previous paragraph by two carriage returns. Headings are written in capital letters. The heading "GENERAL INFORMATION" in this "Guidelines for Authors" is a first-order heading. Second-order headings are place flush with the left margin, written in capital and lower case letters, italicized (underlined in typescript), followed by a period and a long dash ("em dash") and are separated by two double spaces from the preceding paragraph (as in the present paragraph). If third-order headings are necessary, they are written in capital and lower case letters, indented as in a normal paragraph, and followed by a period. Text immediately follows a third-order heading. There are examples of third-order headings in this "Guidelines for Authors" under "Citations," below. Do not, use more than three orders of headings.

Citations.-Italicize (underline_in typescript) titles of books and journals that appear in the text of your manuscript. For example, "Schultes and Raffauf (1990) in their book *The Healing Forest: Medicinal and Toxic Plants of tire Northwest Amazon* report that..." This style is permitted occasionally for variety. Generally, titles of published works do not appear in the text. Follow examples below to cite previously published articles, books, and materials. Note that commas separate multiple works by a single author, semicolons separate works by different authors.

Single reference. Gade (1985) or (Gade 1985).

Multiple references. Posey (1984,1986) or (Posey 1984,1986). Posey (1986) and Balée (1989), (Posey 1986; Balée 1989), or (Posey 1984,1986; Balée 1989).

Multiple authors. Farrington and Urry (1985) or (Farrington and Urry 1985). For more than two authors: Klippel et al. (1987) or (Klippel et al. 1987).

Unpublished sources. We discourage the use of unpublished sources. It is difficult, often impossible, for the reader to verify or check the interpretation of material cited in this way. If it is absolutely necessary to use an unpublished source, please aid the reader by providing additional information as a note, e.g., the name and address of the person being quoted or paraphrased or the name and address of the person and/or institution where the information is on file or on deposit. Because of the detailed information to be placed in the "NOTES" section, unpublished sources do not appear in the "LITERATURE CITED" section. Follow these examples for citations.

Joe E. Doe (personal communication 1989)1, or John E. Doe (written communication 1989).[1] Also: Jane E. Doe (report in the files of... 1989)[1], or Jane E. Doe (manuscript in the files of ...1989)[1], or John E. Doe (data on specimen label... 1959)[1].

Notes.-Footnotes are not permitted at the bottom of pages. Notes, if any, appear at the end of the manuscript, immediately before the Literature Cited section. Con-

sult recent volumes for examples.

Acknowledgements.-Although acknowledgements are commonly given, they are optional. If you have such a section, place it at the end of the text of the manuscript, i.e., after "Notes" (if any) and before "Literature Cited." See examples in recent volumes.

LITERATURE CITED

Note in the examples below that authors of the works cited in the text of the manuscript are to be given here as they were in the original publication, i.e., with fully written names, with first names and an initial, or with initials only as in the original article. The Works cited in the text of the manuscript are arranged alphabetically by author with the names of authors and co-authors in capital letters. Also note in these examples that the titles of book chapters and journal articles are not capitalized, except for proper nouns, place names, and names of persons. However, the books and journals in which these appear are capitalized fully, as indicated below. Write out the names of book and journal titles completely; do not abbreviate, as the space saved is not worth the information lost. Do not list works which are not cited in the text of the manuscript. In addition to those given below, consult examples in recent volumes of the journal.

ADAMS, KAREN R. 1984. Evidence of wood-dwelling termites in archaeological sites in the southwestern United States. Journal of Ethnobiology 4:29-43.

ADAMS, KAREN ROGERS.1988. The ethnobotany and phenology of plants in and adjacent to two riparian habitats in southeastern Arizona. Ph.D. dissertation (Ecology and Evolutionary Biology), University of Arizona, Tucson.

ANDERSON, EDGAR.1956. Man as a maker of new plants and new plant communities. Pp. 763-777 in Man's Role in Changing the Face of the Earth, William L. Thomas, Jr. (editor). University of Chicago Press, Chicago.

HARLAN, JACK R. and J.M.J. DEWET. 1965. Some thoughts about weeds. Economic Botany 19:16-24.

HASTORF, CHRISTINE A. and VIRGINIA S. POPPER (editors). 1989. Current Paleoethnobotany, Analytical Methods and Cultural Interpretation of Archaeological Remains. University of Chicago Press, Chicago.

SLEDGE, W. ARTHUR and RICHARD EVANS SCHULTES. 1988. Richard Spruce: A multitalented botanist. Journal of Ethnobiology 8:7-12.

Ethnobotany

Ethnobotany

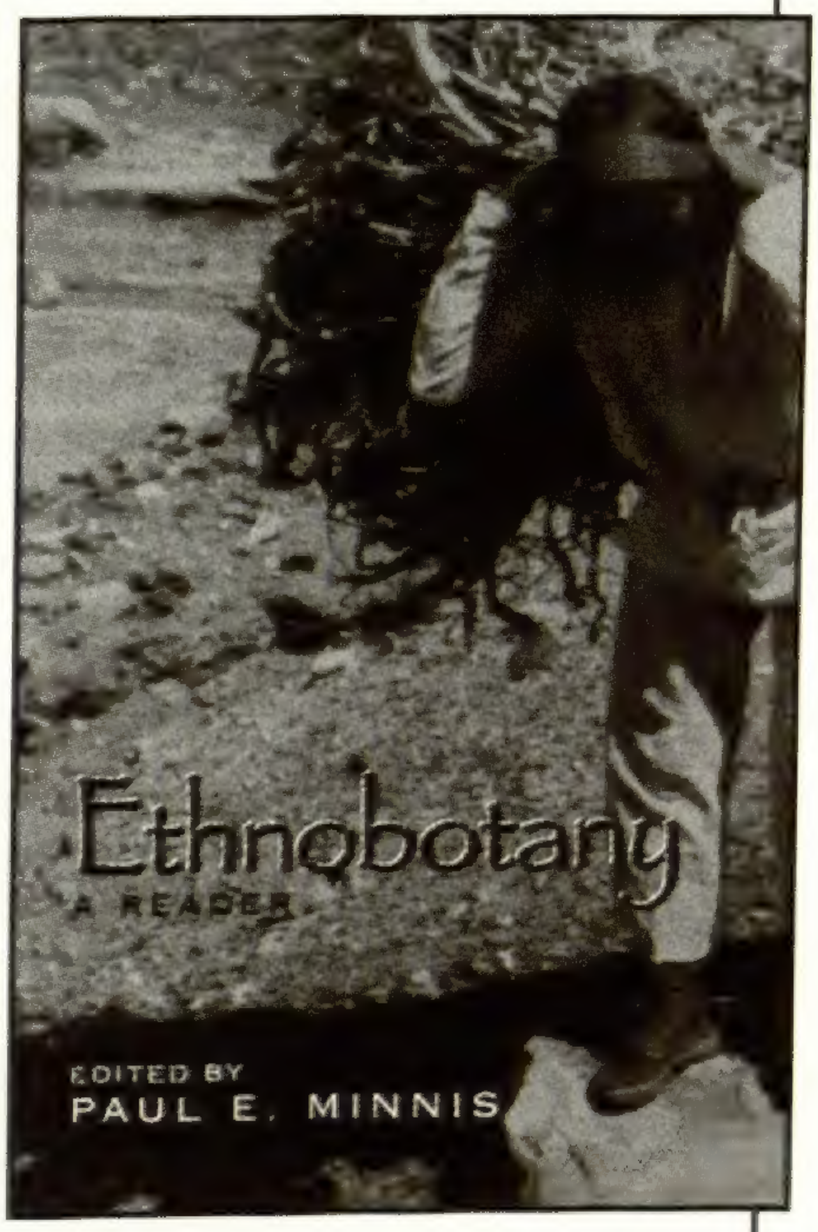
A Reader

Edited by Paul E. Minnis

This book is intended for use as a textbook in upper division undergraduate and graduate courses in economic botany, ethnobotany and human ecology. This reader in ethnobotany includes 14 chapters organized in four parts. Minnis provides a general introduction; the authors of the section introductions are Catherine S. Fowler (ethnoecology), Cecil H. Brown (folk classification), Timothy Jones (food and medicines), and Richard I. Ford (agriculture).

22 b&w illustrations and 42 line drawings

$18.95 Paper *New*



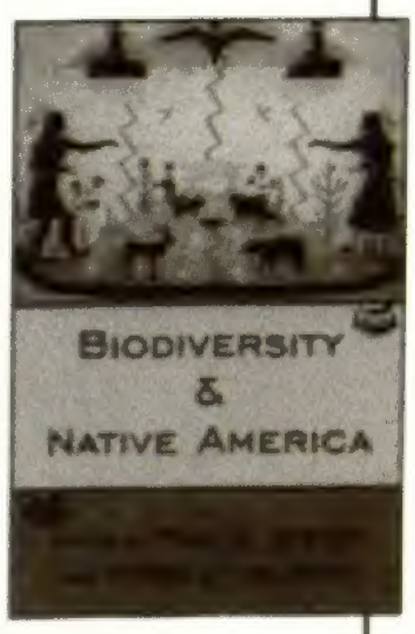
Biodiversity and Native America

Edited by Paul E. Minnis and Wayne J. Elisens

Exploring the relationship between Native Americans and the natural world, this book questions the widespread view that indigenous peoples had minimal ecological impact in North America. Introducing a variety of perspectives this volume shows that Native Americans were active managers of natural ecological systems.

18 b&w illustrations,
4 maps and 4 line drawings

$34.95 Hardcover *New*



Contents

ETHNOGRAPHIC CASE STUDIES

1. Native American Management and Conservation of Biodiversity in the Sonoran Desert Bioregion: An Ethnoecological Perspective
2. Relationships between Mexican Ethnobotanical Diversity and Indigenous Peoples
3. Ethnopharmacology and the Search for New Therapeutics
4. "We Live by Them": Native Knowledge of Biodiversity in the Great Basin of Western North America
5. "Just Like a Garden": Traditional Resource Management and Biodiversity Conservation on the Interior Plateau of British Columbia
6. Iwígara: A Rarámuri Cognitive Model of Biodiversity and Its Effects on Land Management

PREHISTORY AND BIODIVERSITY

7. Human Disturbance and Biodiversity: A Case Study from Northern New Mexico
8. Levels of Native Biodiversity in Eastern North America
9. Ethnohistory of Aboriginal Landscapes in the Southeastern United States

Visit our new website: www.ou.edu/oupress

University of Oklahoma Press

4100 28th Avenue N.W. • Norman, OK 73069-8218
405.325.2000 or 800.627.7377 • Fax: 405.364.5798 or Fax: 800.735.0476
www.ou.edu/oupress • AMEX • Visa • MasterCard

Missouri Botanical Garden Library
3 1753 00288 5645

NOTICE TO AUTHORS

The *Journal of Ethnobiology*'s revised "Guidelines for Authors" appears in this issue (pp. 277-280). If you need a copy of these Guidelines you may request a copy from the Editor. Careful scrutiny of recent issues of the *Journal* should provide appropriate stylistic models for any manuscript you may wish to submit.

Those submitting manuscripts for consideration for publication in the *Journal* should send three hard copies and one copy on a high density 3.5" diskette in IBM-compatible or Apple format with original camera-ready figures. Manuscripts submitted in inappropriate style and format will be returned.

Manuscripts should be sent to:

WILLIAM BALÉE
Editor, *Journal of Ethnobiology*
Department of Anthropology
Tulane University
New Orleans, LA 70118 USA
(wbalee@mailhost.tcs.tulane.edu)

BOOK REVIEWS

We welcome suggestions on books to review or actual reviews from readers of the *Journal*. If you submit a book review for consideration please send two hard copies and one on diskette. Send suggestions, comments, or reviews to:

MICHAEL K. STEINBERG
Book Review Editor, *Journal of Ethnobiology*
Department of Geography-Anthropology
University of Southern Maine
Gorham, ME 04038
(mstein@usm.maine.edu)

SUBSCRIPTIONS

Subscriptions to the *Journal of Ethnobiology* should be addressed to Virginia Popper, UCLA Institute of Archaeology, Box 951510, Fowler A-210, Los Angeles, CA 90095-1510 USA. Subscription rates are $60 for institutional subscriptions; $25 for students; $35 for regular individual subscriptions except for Latin America, for which subscriptions are $25. Joint members (with spouse, receiving a single copy of the *Journal*) pay $35. For postage outside of the USA, Canada, or Mexico, add $10. Make checks payable to the *Journal of Ethnobiology*. Defective or lost copies will be replaced if a written request is received within one year of issue. For information on back issues contact Cecil Brown, Department of Anthropology, Northern Illinois University, DeKalb, IL 60115 USA, (815) 753–0246.

CONTENTS

ETHNOBIOTICA v

IS THE *FRAILEJÓN* A LIFE FORM OR AN UNAFFILIATED GENERIC?: EXAMINING THE RANK OF AN ENDEMIC PARAMO PLANT
Egleé L. Zent and Stanford R. Zent 143

GITKSAN PLANT CLASSIFICATION AND NOMENCLATURE
Leslie Main Johnson 179

ETHNOBOTANICAL OVERVIEW OF *GOGD (Allium ramosum L.)*: A TRADITIONAL EDIBLE WILD PLANT USED BY INNER MONGOLIANS
Khasbagan, Narisu, and Kevin Stuart 221

PLANT SPECIES (POACEAE, ASTERACEAE, FABACEAE AND SOLANACEAE) AT AN ARCHEOLOGICAL SITE IN THE SOUTHERN ARGENTINE PUNA
Maria Fernanda Rodriguez 229

RECENT DOCTORAL DISSERTATIONS OF INTEREST TO ETHNOBIOLOGISTS XVII
Terence E. Hays 251

THE PROCESS AND SOCIOCULTURAL SIGNIFICANCE OF GOPHER TRAPPING IN A MODERN YUCATEC MAYA COMMUNITY
Kevin Hovey and Dominique Rissolo 261

BOOK REVIEWS 177, 219, 226, 248, 258

GUIDELINES FOR AUTHORS 277